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PRODUCTION EDITION

for Manufacturers of Chemicals for Agriculture

IN THIS ISSUE:

MODERN LIQUID FERTILIZER PLANT—Interior of Zehr & Co., Archbold, Ohio, maker of complete liquid plant food. (See article, page 2.)

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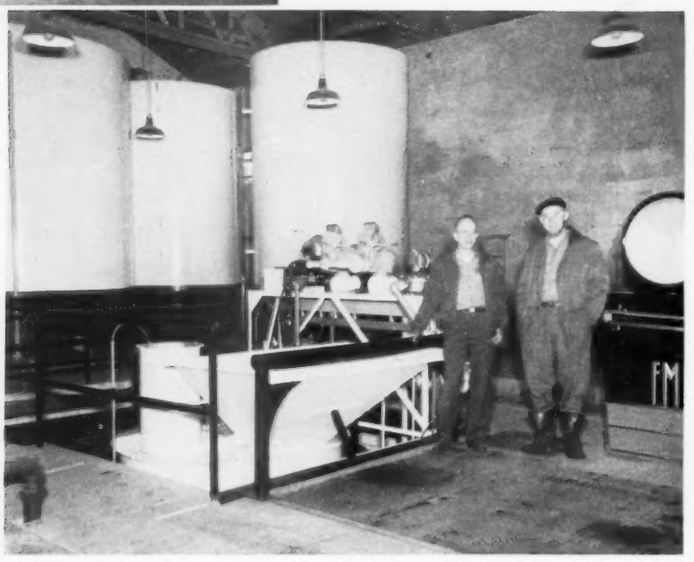
INSIDE LIQUID PLANT—Manufacture of complete liquid fertilizer mixes is the function of the Zehr & Company plant, Archbold, Ohio. At left, Hough "Payloader" is utilized to move potash from railway cars into the plant where it is stored in a 40-ft. deep bin. Below is different view of mixing room with James A. Zehr, owner, at right and Harold Dawson, soil analyst at left. The plant was established in 1956 as a liquid nitrogen business, but later expanded facilities to include complete mixed fertilizers. (See also picture on front cover.)



OHIO OPERATION . . .

Liquid Fertilizer Plant

A SUCCESSFUL liquid fertilizer firm manufacturing complete liquid mixes is that operated by Zehr & Co., Archbold, Ohio. Consumption of this form of plant food is on the increase in much of the midwest, and the farming area surrounding Archbold, in the northwestern corner of Ohio, not far from the Indiana and Michigan state lines, is no exception.

At first built for distribution of liquid nitrogen, the company's initial structure was a new office building, 20 x 50 ft., equipped with truck scales in anticipation of selling complete liquid fertilizer at a later date. The liquid business went along very well and, in due time, the decision was made to expand into the business of making complete fertilizers.

A concrete block structure was then erected to house the equipment for this broader activity. Construction was timed so the facilities would be completed in time for spring sales, and all was in readiness for the season of 1957.

Since that time, the firm has continued to grow. The plant's aqua ammonia storage facilities now consist of two 17,000-gal. mild steel tanks. For storage of potash, the firm has a 20 x 40 ft. bin which is approximately 40 ft. deep. A slat floor covers half of the top of the bin so potash may be dumped in the space. A Hough "Payloader" is utilized to unload railroad freight cars. This machine unloads a 40-ton car in approximately two hours, the firm reports.

Phosphoric acid is stored in a 10,000-gal. mild steel tank which is lined with plastic. The acid runs through plastic lines to the reactor.

Similarly, urea is also stored in a 10,000-gal. mild steel tank.

Inside the building are four more mild steel tanks of 5,000 gal. capacity each. These are used for storage capacity for approximately 100 tons of complete liquid fertilizer.

Still more tanks are located outside of the building for holding fertilizers of special analyses. Three tanks of 4,000-gal. capacity each are used for this purpose. Also, two 8,000-gal. tanks and one 4,000 gal. holder are utilized for outside storage of liquid fertilizers.

In addition to the above facilities, the company leases applicators to farmers in its trading area, along with thousand-gallon tanks for storage of liquid plant food on the farmer's premises.

James A. Zehr heads the company at Archbold. He started in the liquid nitrogen business in 1956 and later developed into the complete liquid fertilizer line. Additional expansion plans are still being considered as volume and demand increase.

Starting in the liquid nitrogen business three years ago, Zehr Company now enjoys thriving trade in complete liquid mixes made in modern plant. Continual expansion marks firm's history.

LITTLE HEAT INVOLVED . . .

Fluid Energy for Pesticide Milling

By Joseph P. McKenna
Fluid Energy Processing & Equipment Co.
Philadelphia, Pa.

PESTICIDE FORMULATION involves the application of many skills; chemical, mechanical and physical. To produce an effective finished product the formulator must consider his toxicant, his inert material and the mechanical devices he has at hand to do the job.

Producing field dusts and sprays from toxicants such as DDT, BHC, Heptachlor, Endrin, Dieldrin, Toxaphene and Chlordane presents problems of particular weight due to the necessity of grinding or milling the materials with the diluent. Heat generated in such an operation poses a continual problem since the toxicants themselves are heat-sensitive and excessive temperatures tend to soften the materials.

This in turn gives the materials poor flowability during the processing and makes it more difficult to come up with the desired properties in finished goods. Efforts made to cut down the heat problem in conventional equipment tend to increase production costs and affect adversely the required uniformity of product.

Mills with no mechanical moving parts which utilize high-velocity streams of fluid to grind particles by causing them to collide with each other rather than with the mill walls, are attracting increased attention from pesticide formulators. This departure from conventional mechanical methods greatly reduces the heat problem. The properties of the toxicant are not affected and flowability remains good.

Makers of fluid energy "Jetomizers" point out that the principle of forcing materials into violent collisions with each other breaks one or both of them into smaller pieces without generating additional heat. This principle underlies the process. Material to be pulverized is exposed to streams of fluid within the machine. Sometimes using air and at other times steam on materials not affected by high temperatures, the jet is put through nozzles which convert the fluid energy into velocity which often reaches supersonic proportions. This causes the solid particles to be swept into violent turbulence in which they collide with each other and are pulverized by the impact.

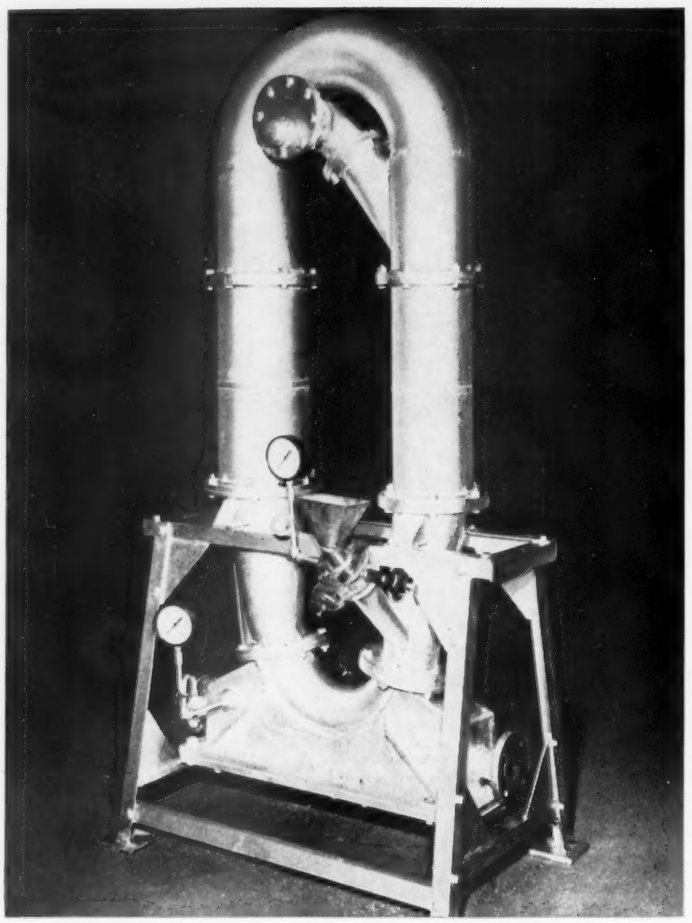
In order to reduce the recirculation of particles not ground to small enough size, a trapezoidal cross-section has been developed to replace the original circular cross-section of the grinding zone. The new arrangement concentrates the material near the fluid nozzles and loads the streams more effectively and increases officiency with reduction of wear on the mill itself.

The makers state that continuity of operation is an important factor in the use of this new type of mill. These units have been operated for as long as a week without having to stop for cleaning out even when processing high concentrations of organic toxicants.

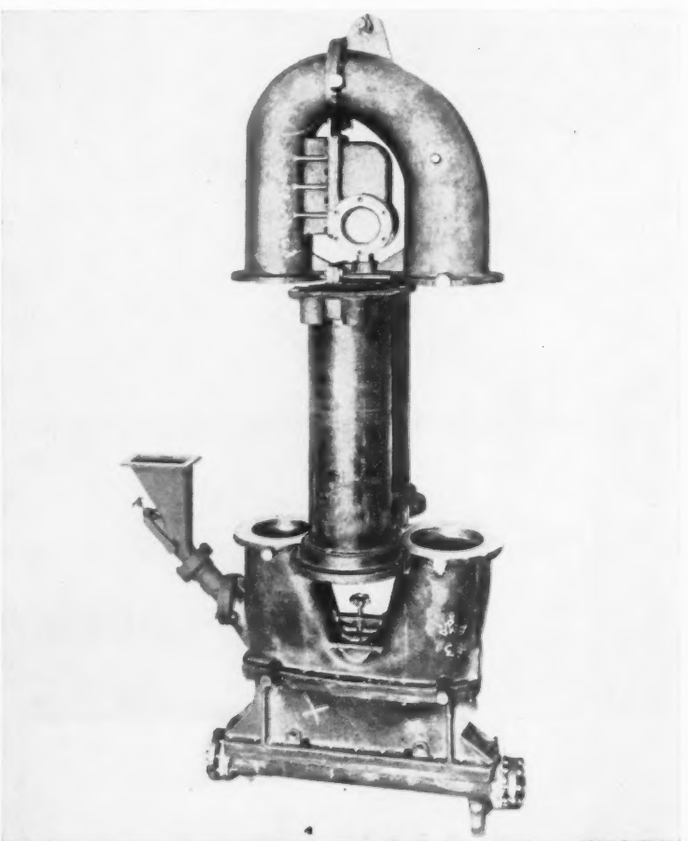
Good control of all processing conditions is one of the factors pointed out as an advantage of the fluid mill. Adjustment of the device is made easily to compensate for variables involved. It is also easy to apply full instrumentation to the installation, the makers say.

The latest type of fluid mill of the "Jetomizer" type was a long time in reaching its present state of development. In the latter part of the 19th century, patents were issued to a

Turn to GRINDING page 29

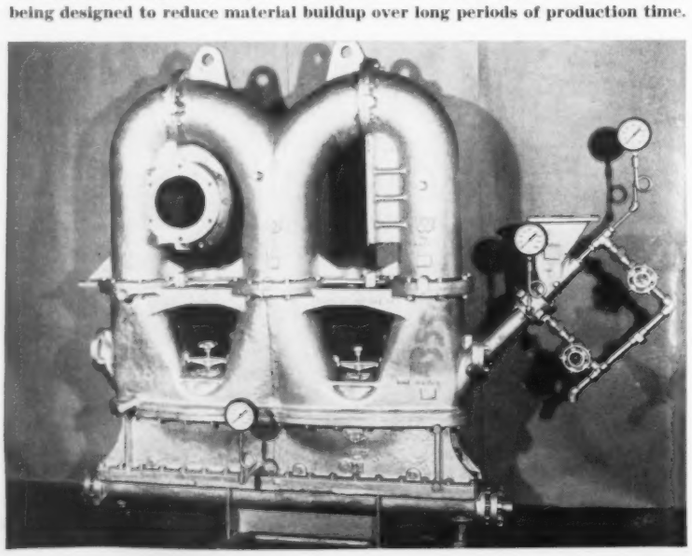


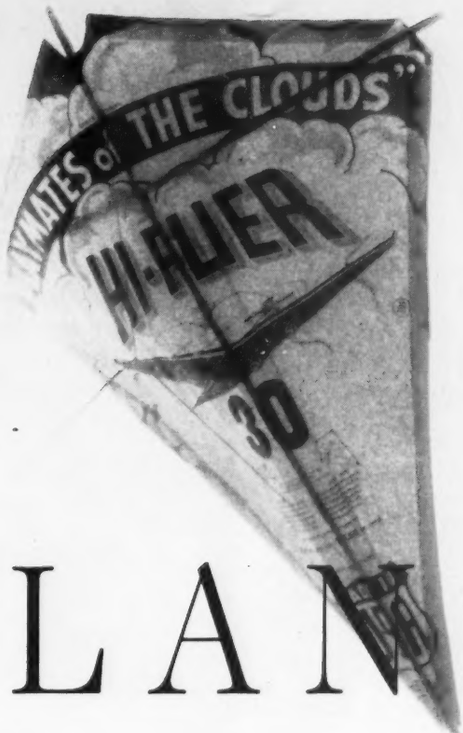
FLUID ENERGY MILLS—One of a new series of simplified design fabricated mills (above) for processing of all grades of agricultural chemicals and inert materials. The unit shown here has a capacity of 700-1200 lb. an hour of 50% DDT.



STANDARD MILL—This type of mill has been utilized by many U.S. processors of agricultural chemicals and has also been installed for similar functions throughout the world in operations producing large tonnages.

DOUBLE UNIT—To maintain unusually high production rates, this newly-designed cast mill is capable of producing large quantities—from 1700 to 3000 lb. an hour of 50% DDT. It is said by its makers to require less clean-out time, being designed to reduce material buildup over long periods of production time.





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QUESTIONS—ANSWERS

From You — From Experts

Question: "My problem is product segregation in the pile after it is made. When it is put in the bag, it is O.K., then it is segregated."—Phil Stumpner, general foreman, Wisconsin Farmco Service, Whitewater, Wis.

Answer: (By Dr. Vincent Sauchelli, chemical technologist, National Plant Food Institute, Washington, D.C.) "The problem is described rather obscurely. If the product is OK when put in the bag, it may be assumed that there was no segregation in the pile. But the inquirer states the problem is segregation in the pile. He believes segregation occurs in the bag.

"If the product is a mixture of different materials and not a homogeneously prepared granulate, it is possible for the mixture to undergo a certain degree of segregation as it is poured into bags. The coning effect seen on a large scale when the bulk fertilizer is emptied into a large bin takes place on a small scale as bags are filled: Large particles separate and roll to outer edges at base of cone-pile, finer particles remain in central core of cone."

Question: "My problem is getting a good true sample of the product during granulation."—R. L. McGary, assistant plant superintendent, Smith Agricultural Chemical Co., Indianapolis, Ind.

Answer: (By Dr. Vincent Sauchelli) "The statement of the problem is not entirely clear, since 'during granulation' might mean any one of a number of things. For instance, is the problem one where it is difficult to sample the product at one or several points in the flow line of the processing? Or, does the question mean there is a problem of getting a truly representative sampling of the product as it leaves the granulator?

"Sampling is difficult at any time, and it is made no easier in the process of granulation. Good results are reported by numerous operators who take a sample of the finished product at the discharge end of the conveyor belt carrying the fertilizer from the mixer, dryer, or granulator to storage."

Question: "We have a problem with our sewing machine from breaking thread. Is there any simple solution to this?"—Michigan Superintendent.

Answer: Union Special Machine Co. has made a study on this subject and offers the following suggestions as possible answers to the problem:

Have you checked for burred needle? Burred looper? For sharp edges on presser foot or throat plate? For too much tension on thread?

Perhaps the sewing head speed is too high.

Maybe the machine is in a generally loose or worn condition.

Could there be knots in the thread being used?

Is the thread you are using too weak for the job it is expected to do? Union Special says: "Be sure to use at least 5 ply No. 12 Bemis Special Thread in needle, 4-ply No. 12 in looper for 100-lb. bags; 4 ply in needle, 3-ply in looper for 75 and 50 lb. bags; 3-ply in needle and looper in bags less than 50 lb."

Associated troubles with sewing machines have to do with skipped stitches. Here are some suggested trouble spots which you might inspect for trouble: (1) Blunt or burred needle, (2) needle and looper not set in proper relation to each other, (3) burred looper, and (4) needle guard improperly set so that it pushes needle away from looper.

Always try a new needle as the first step in overcoming skipping, since this is the most frequent source of trouble.

Question: "My production problem has to do with the corrosive condition on fertilizer and spraying equipment." — Al Reposa, equipment manager, The Triangle Co., Salinas, Cal.

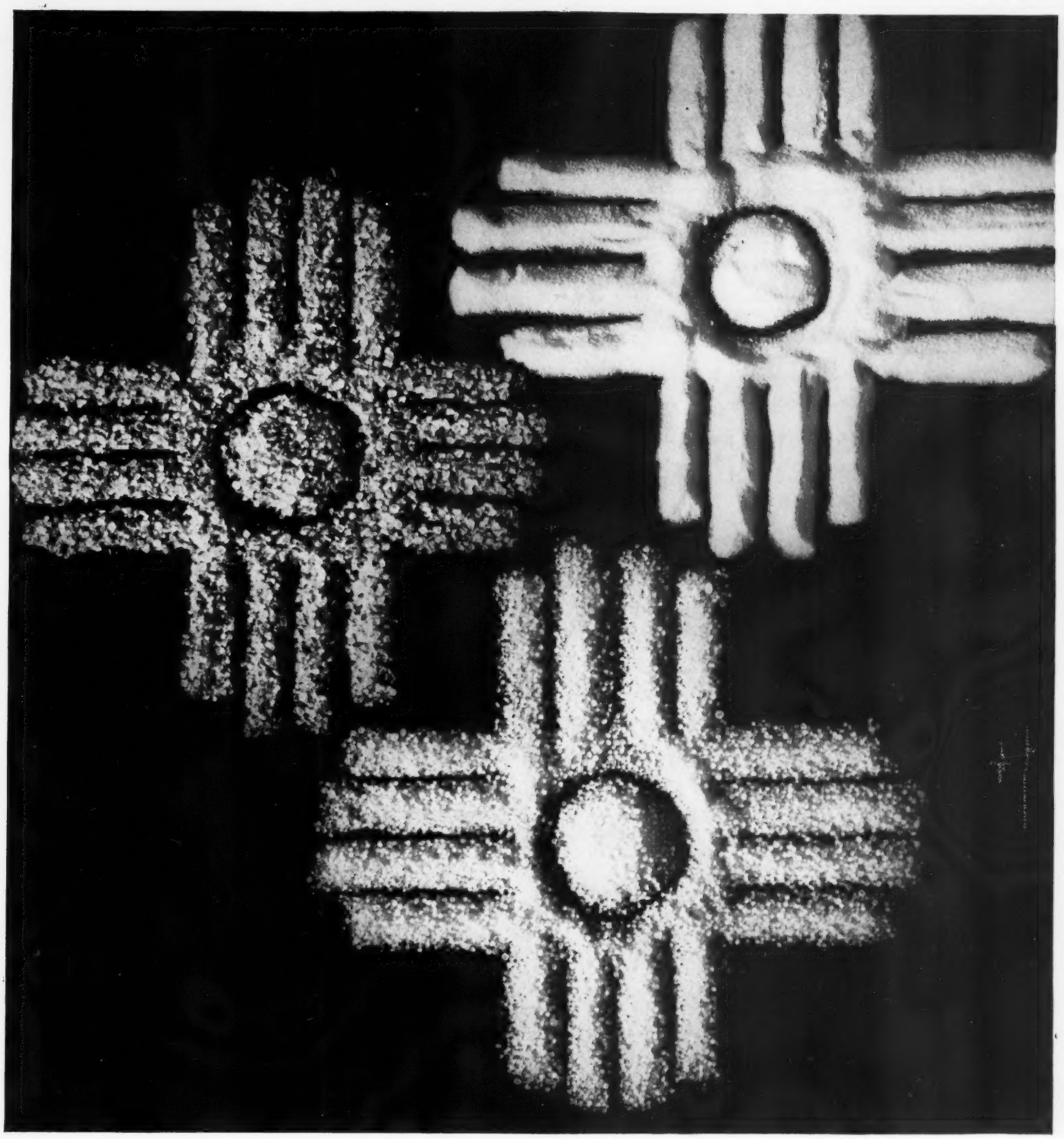
Answer: (By Dr. Vincent Sauchelli) "This universal problem is being tackled aggressively by equipment manufacturers. The Tennessee Valley Authority has published its studies on the corrosion of metals by liquid mixed fertilizers (J. Ag. & Food Chem., July 1958). Some manufacturers are using fiber-glass resin to line truck tanks as a preventive coating. Stainless steel is being utilized for tanks, valves and applicator booms and even the float. Plastic pipes are

Turn to QUESTIONS page 8

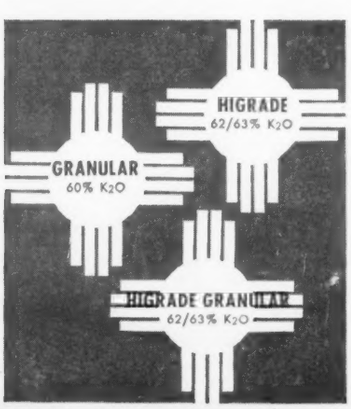
EDITOR'S NOTE

This "Question and Answer" department is expected to become a regular feature of Croplife's Production Edition. The questions listed here were sent in by superintendents and foremen from all types of plants in different parts of the U.S. Space permits publication of only a fraction of the questions sent in, but we wish to acknowledge these queries and thank the writers.

Croplife solicits more of these from readers who have puzzling production problems. Send us a card or letter giving specific outline of the problem at hand. Address: Croplife, Box 67, Minneapolis 40, Minn.



Better fertilizers begin with three top quality grades of USP potash



For the manufacture of all modern fertilizers, USP offers *three* outstanding grades of potash: two white grades—Higrade muriate and Higrade Granular muriate—each containing 62/63% K_2O, and each specially sized to meet current fertilizer manufacturing requirements. These white muriates give you the most potash per ton for mixed fertilizers. And USP's Granular muriate, containing 60% K_2O, is ideally suited for fertilizer uses requiring a still larger particle size. All three grades resist caking and remain free-flowing for easy storing and handling.

For complete technical data and shipping information, contact the United States Potash Company. Our expertly staffed Technical Service Department welcomes your inquiries.

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QUESTIONS – ANSWERS

Continued from page 6

also used to prevent corrosion. We have learned that some equipment is now provided with plastic distributor heads and stainless steel screens for liquid mixed fertilizers and nitrogen solutions. Special anti-corrosive paints have been developed by other manufacturers which seem to give protection against corrosive agents."

Question: "Please give me the best methods of applying Aldrin solutions to fertilizers; also, recommendations for safety equipment for the full protection of employees."—Ohio Superintendent.

Answer: (By Louis Lykken, manager technical service department, Shell Chemical Corp., New York) "Solid aldrin-fertilizer mixtures are prepared either by blending Aldrin granules with cured fertilizer, or by impregnating the cured fertilizer with an Aldrin solution. The mixing can be done in batches or by continuous process. Aldrin is compatible with most solid cured fertilizers and is used with granular, pulverized, and organic fertilizers.

"Blending of solid fertilizer with Aldrin solid concentrates or solutions may be done with any type of blending equipment suitable for solids and designed to give good mixing, necessary to achieve uniform distribution throughout the fertilizer. Mixing can be done in batch equipment such as a blender, tumbler, or concrete mixer, or in a continuous operation by adding an Aldrin concentrate to a stream of fertilizer in a predetermined, metered ratio.

"In the batch method, the Aldrin solution is impregnated onto the fertilizer or added as granules or dust concentrate.

"In the continuous process, Aldrin is generally added by impregnation. The addition of a solid concentrate, in batch method is applicable to all types of solid fertilizers, including organic fertilizers and salts. The impregnation method, whether done by the continuous or batch process, is limited to fertilizers that have, at least, a small sorptive capacity.

"It is not practical to add Aldrin to 'uncured' fertilizer (such as before or during the mixing of the ingredients) because the high temperature in the curing stage may cause loss by volatilization. Similarly, in the continuous process, the temperature at the point of Aldrin addition should not exceed 120° F.

"The impregnation technique is, in general, the preferred means of adding Aldrin to cured fertilizer, both in the pulverized and granular forms. This holds true for both the continuous and batch methods of mixtures. Impregnation leads to a minimum of stratification of Aldrin and tends to reduce its loss in form of dust, yet, it allows for adequate distribution throughout.

"Cured fertilizer is charged to any suitable blending equipment, such as a drum mixer, tumbler, ribbon blender, concrete mixer, etc. While the blender is operating, a solution containing 4 lb. Aldrin to the gallon is sprayed onto the fertilizer. The nozzles used should deliver a relatively coarse spray and the operation should be done in an area that is well ventilated, preferably by forced draft.

"The solution used should have a flash point over 115° F. and should contain enough aromatics to retain the pesticide in solution at the coldest operating or storage temperature. After impregnation is complete, the mixing operation is continued for several minutes to insure uniform distribution in the mixture. From time to time, it is advisable to obtain a representative sample to determine the content.

"Alternatively, the Aldrin can be added in form of 20 or 25% granules (30 to 60 mesh). Such granules are preferred because they minimize dilution of the fertilizer and they do not alter the fertilizer below its stated nutrient content level. They also lead to relatively little stratification in the fertilizer mixture.

"It is also possible, in some instances, to use 20 or 25% Aldrin dust concentrates instead of granules. In this application, such concentrates are usually made 'dustless' by preparing them to contain 5 to 10% kerosene or light oil. The dust concentrates are suitable only with pulverized fertilizers. They are not ordinarily used with granular or crystalline grades because the Aldrin dust tends to stratify under normal handling and shipping conditions.

"The fertilizer is treated continuously with Aldrin at a suitable stage in the cooling period, or in conveying where the fertilizer passes by at a steady rate. This is done by spraying a solution containing 4 or 6 lb. of Aldrin per gallon onto the stream of fertilizer at a metered rate in direct proportion with the rate of movement. The temperature at or beyond the point of impregnation should not exceed 120° F.

"The solution used should have a flash point over 115° F. and should contain enough aromatics to retain the Aldrin in solution at the coldest operating or storage temperature. The impregnation should be done in an enclosed and well ventilated area. After the impregnation area is left, the stream of fertilizer should be mixed by turning it over and over before bagging or storing. It is advisable to take occasional samples.

"In treating granular fertilizers, the Aldrin is added after cooling and final screening and before bagging or storing. Application here minimizes volatilization which might occur if added during high temperature steps. It also minimizes possible waste since some fertilizer granules are often reprocessed and thus retreated.

"A logical place to add the Aldrin is at a point where the finished fertilizer flows in a stream on a conveyer belt. Here an assembly carrying two or more spray nozzles in a row with a scraper-agitator mounted down stream from each nozzle is used. This exposes fresh surfaces to achieve mix-

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What's New?

Additional information is available about new products, new services, and literature described in this department. Circle the numbers of items on which you desire more information, fill in your name, your job title, your company's name and address on the card. Then clip it out of the page and mail. No postage is necessary.

No. 9061—Polyethylene Coated Bags

Bags with a coating of polyethylene to keep superphosphates dry during shipping and storage have been announced by Union Carbide Plastics Co. and Kraft Paper Bag Corp. Because superphosphate has a

tendency to dry out in plain bags, the firms developed the polyethylene coating to prevent it. The bags will not split at creases or accept moisture, literature explained. It was noted that the multi-wall bags made with polyethylene coated kraft paper are approximately 40% lighter than most conventional paper bags. Details can be obtained by checking No. 9061 on the coupon and mailing to this publication.

No. 9063—Conveying System Bulletin

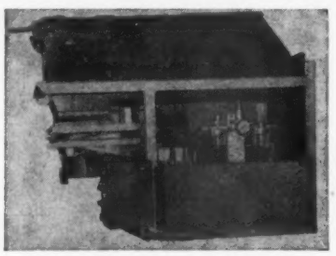
The availability of a technical booklet describing Pneu-Pac, a pneumatic conveying system for car, truck or bin unloading, has been announced by Sprout, Waldron & Co., Inc. Bulletin 211 illustrates and describes each component of the system, including vacuum nozzle, the products collector, the positive displacement blower and the airlock feeder. It includes a schematic drawing of a typical system for unloading freight cars and conveying material to bulk bins. Dimensions and specifications are also shown. Basic information on a recently introduced portable Pneu-Pac system designed for in-plant transfer of granular free-flowing material is included. Check No. 9063 on the coupon and mail for details.

No. 9071—Chemical Booklet

A new book on ethylene amines designed for research chemists and technical personnel has been issued by the Dow Chemical Co. The material is used in the agricultural chemical trade for insecticides, herbicides, fungicides and for controlling fruit set and in chelating agents to correct iron deficiencies in plants. The 65-page publication includes a list of properties, reactions, uses, first aid techniques, handling and storage information, property graphs and a bibliography covering patent and use sources. The booklet is available by checking No. 9071 on the coupon.

No. 9062—Gross Weigher

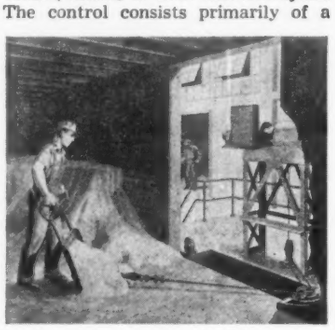
Thayer Scale Corp. announces the Thayer Gross Weigher which discharges directly into a container. The Thayer belt feeder, with air actuated bulk and dribble gates, permits adjustable flow and is particularly suitable where material cannot



be hoppered, the company says. The unit handles flooding or erratic flow materials. The feeder and scale are totally enclosed and the control box containing all switches and scale indicating lights can be mounted remotely. Information is available by checking No. 9062 on the coupon and mailing to this publication.

No. 9060—Scoop Control Switch

The Alden division of Amercon Corp. has announced that an electronic safety control has been incorporated in the firm's power scoop, used for unloading bulk materials from box cars into track hoppers, elevators, chutes or onto belt conveyors. The control consists primarily of a



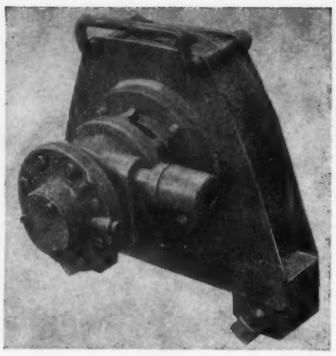
radio remote transmitter which automatically controls the operation of the scoop with the pressing or releasing of a dead man switch in the scoop handle. An illustrated folder, giving complete specifications and information is available upon request. Check No. 9060 and mail to this publication.

No. 9070—Power Scoop Data

A file-size folder telling how bulk materials can be unloaded from boxcars in a shorter time has been announced by Alden Equipment Division of Amercon Corp. The brochure describes a variety of applications for the company's automatic safety power scoop and gives data about the unit's new electronic radio-transmitter for stop and go. Complete specifications are included. The brochure also contains a reproduction of the blueprint of the unit. Copies can be obtained by checking No. 9070 on the coupon and mailing to this publication.

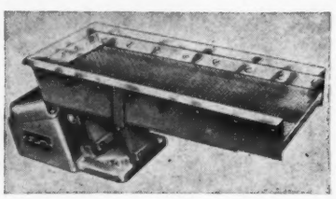
No. 9064—Vibration Inducer

A high-amplitude vibration inducer, which starts and keeps materials moving during the unloading of railroad cars or hoppers, has been introduced by the Martin Engineering Co. Called the "Vibrolator CCVP," the unit can be used for material movement from huge bins, hoppers or chutes. It is portable with its own mounting clamp and can be mounted in any position or angle convenient to the job, the company says. The unit is pneumatically-driven, starts and operates with minimum air at any angle, the company says, and it is also shock-proof and spark-proof. The CCVP can be controlled at any vibration frequency from a few cycles to more than 60 cycles per second, the company says. Check No. 9064 and mail for details.



No. 9069—Screening Feeder

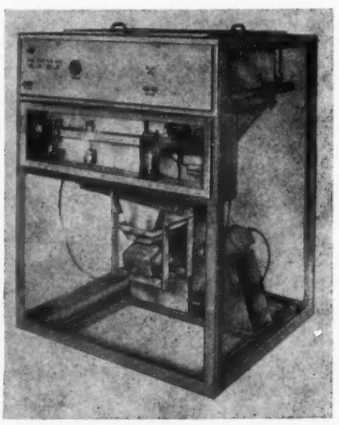
Development of a small, highspeed screening feeder for rate-controlled simultaneous screening and feeding of powders or other fine bulk materials



in relatively small quantities has been announced by Syntron Co. Electromagnetically vibrated, the SF-01 Screening Feeder provides particle agitation to effect the rapid separation of particles by size and to provide positive, lag-free feeding of the sized or separated particles into the next processing operation, the company said. Power of vibration is adjustable by a turn of a rheostat dial on the unit's separate controller, which can be mounted at any distance from the screening feeder. Check No. 9069 on the coupon and mail for details.

No. 9051—Weigh-Feeder

Information describing a new weigh-feeder machine designed for electronically-controlled feeding of dry chemicals is offered in literature



issued by the Syntron Co. The makers point out that unusual accuracy is made possible by the use of electronic control rather than mechanical connection of the feeder to the scale beam. An electromagnetic vibrator on the hopper keeps the materials free-flowing and insures dependable supply to the feeder, Syntron says. Ac-

Send me information on the items marked:

- ☐ No. 9051—Weigh Feeder
- ☐ No. 9057—Bin Level Indicator
- ☐ No. 9059—Checkweigher
- ☐ No. 9060—Control Switch
- ☐ No. 9061—Polyethylene Coated Bags
- ☐ No. 9062—Gross Weigher
- ☐ No. 9063—Conveying Bulletin
- ☐ No. 9064—Vibration Inducer
- ☐ No. 9067—Loader for Tractors
- ☐ No. 9068—Vibratory Feeder
- ☐ No. 9069—Screening Feeder
- ☐ No. 9070—Power Scoop
- ☐ No. 9071—Chemical Booklet
- ☐ No. 9072—Weight Indicator

NAME .....

POSITION ..... ☐ Fertilizer Mfr. ☐ Pesticide Mfr.

COMPANY ..... ☐ Both ☐ Other

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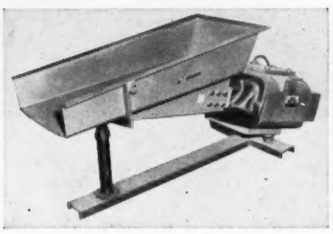
cording to the makers, the unit, consisting of a hopper with its vibrator; the vibrating feeder and the weighing, recording and control components, are completely contained within a dust-tight sheet metal cabinet. The unit may be equipped with many optional features, including larger or smaller hoppers, cabinets arranged for automatic loading, special troughs for the vibratory feeder, mixing tanks, special timing and totalling devices, heat lamps and other features. For complete information, check No. 9051 on the coupon.

No. 9068—"Vibratory" Feeder



Eriez Manufacturing Co. announces the "Hi-Vi Vibratory Feeder" model V3B-70A, with a capacity rated at 50 tons an hour. The design of the unit incorporates the construction features of a smaller Eriez feeder, the company said. Included among the features are the Eriez electro-permanent magnetic drive system which operates directly from alternating current without a rectifier and the Eriez spring system of epoxy-boned fibreglass. The unit feeds bulk materials in a wide range of particle sizes, the company says, and can be adapted to spreading, drying or agitating materials, handling hot materials, or moving materials into hot areas at a precise rate. Complete details are available by checking No. 9068 on the coupon and mailing.

No. 9059—High Speed "Checkweigher"

A Thayer Scale Continuous High Speed Checkweigher for package and unit inspection has been announced by Thayer Scale Corp. The unit is equipped with a patented Thayer

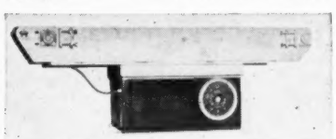
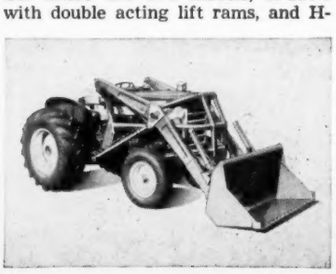


plate flexure plate leverage system, which the company claims will retain its accuracy for the life of the scale. The scale has a high speed continuous running conveyor belt capable of handling up to 100 lb. bags at a rate of up to 25 per minute, company literature said. As the package travels across the scale it is automatically weighed, with the weight indicated on an over-under dial. A warning device sounds in the event of off-weights beyond set tolerances. Check No. 9059 and mail to this publication for details.

No. 9067—Loader for Tractors

An industrial loader specifically designed for International Harvester 240U and 340U tractors has been announced by Superior Equipment Co. There are two models, H-228-I with double acting lift rams, and H-128-I with single acting lift rams. Both models have dual bucket rams, independent hydraulic systems, box type lift arms, tubular frames and pry-out bucket action. The bucket clears 10 ft. 11 in. at full height. The company says a complete variety of attachments including buckets, manure forks, crane, fork lift and front dozer blades are available. Check No. 9067 on the coupon and mail for details.

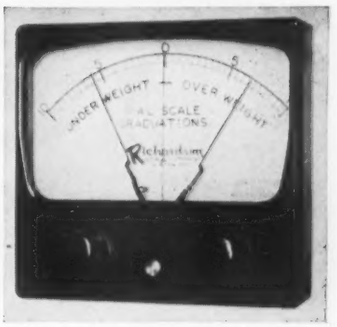


No. 9057—Bin Level Indicator

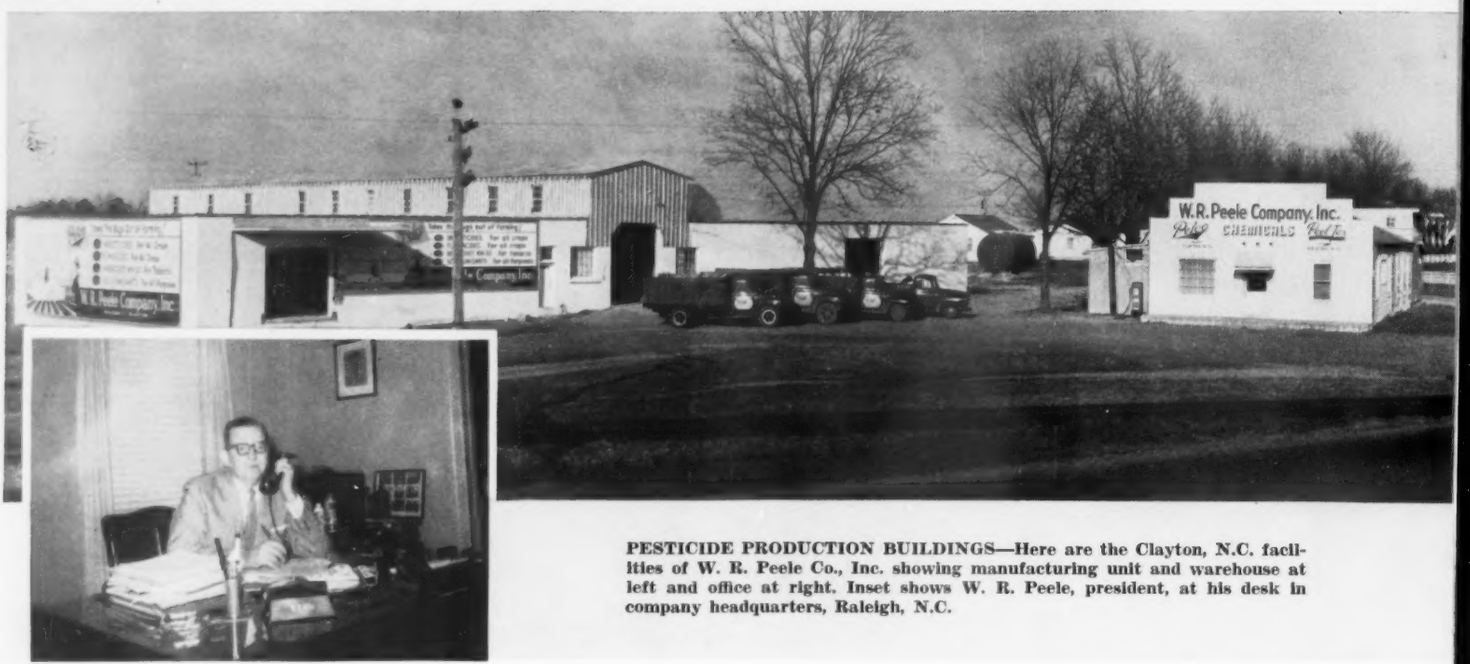
An automatic bin level indicator, designed for applications where corrosion and chemical action may be factors, is announced by BinDicator Co. The "Auto-Bin-Dicator" body is made from heavy aluminum castings and the diaphragm is of stainless steel. The company says the controlled movement of the spring-loaded diaphragm and the sensitivity of the switch mechanism make the unit responsive to changes in pressure of materials, and it functions equally well controlling levels of light, low density materials as heavy, dense, coarse or abrasive materials. The unit can be affixed to thick or thin walled bins, or suspended within the bin. It can also be used in chutes and hoppers to prevent choke-ups, overfeeding and damage to machinery, the company says. For details about all models, which are listed by Underwriters' Laboratories, check No. 9057 on the coupon and mail to this publication.

No. 9072—Weight Indicator

A panel-mounted off-weight indicator to safeguard against spoiled mixtures and batches in automatic proportioning systems is being introduced by the Richardson Scale Co. Designed for use with the Richardson "Select-O-Weigh" automatic proportioning



system, the new instrument provides a visual indication of the number of "off weight" graduations for each ingredient weighed by the system. This graduated reading makes it possible to correct a trend to overweighing or underweighing before the actual limit of tolerance is reached, thus preventing spoiled mixtures. Check No. 9072 on the coupon for more information.



PESTICIDE PRODUCTION BUILDINGS—Here are the Clayton, N.C. facilities of W. R. Peele Co., Inc. showing manufacturing unit and warehouse at left and office at right. Inset shows W. R. Peele, president, at his desk in company headquarters, Raleigh, N.C.

NORTH CAROLINA OPERATION . . .

W. R. Peele Firm Uses Modern Facilities to Make Pesticides

"Pelco" Brand Insecticides, Fungicides, Weed Killers and Soil Fumigants Well Known in Southeast. Product Lives up to Motto: "Takes the Bugs Out of Farming."

MODERN PRODUCTION equipment, ample storage and warehouse space, and an effective distribution setup are features of the W. R. Peele Co., Inc., with executive offices at Raleigh, N.C., and plant at Clayton, N.C., about twenty miles to the southeast of Raleigh.

The firm makes various types of pesticides, both liquid and dry, for use of farmers in the area who need these products to protect their cotton, tobacco, and other crops from insect damage. Sold under the "Pelco" label, the drums, bottles and bags of this material are familiar sights on farms throughout the Carolinas. Not only insecticides are made by Peele. Fungicides, herbicides and soil fumigants are also important products of the company.

As indicated in the accompanying photographs, the Peele company is not only housed in modern buildings, but its housekeeping standards are high. These factors step up the general efficiency of the plant. Convenient docks for loading and unloading trucks, nearby rail facilities and a central location in the state all contribute to the smooth operation of the business.

The firm was organized in the fall of 1946 and, in the fourteen years since that time, has seen constant growth. Its original function, as it is still, is mixing insecticides and distributing such materials as well as other agricultural chemicals throughout its trade territory.

The company was incorporated in November, 1951 under the laws of North Carolina and its officers, named at that time, still maintain their posts. William R. Peele heads the firm as president. Under him are Paul Keller, vice president and Madeline S. Peele, secretary. Mr. Peele per-

PESTICIDE PLANT—Interior of W. R. Peele Co. manufacturing plant at Clayton, N.C., showing part of dual line, dry dust mixing. In other parts of the plant, liquid operations are conducted. Peele makes insecticides, fungicides, herbicides and soil fumigants in modern manufacturing facilities. Company products are distributed over wide area of Carolinas under "Pelco" label.

ON THE HOMEFRONT—Above: Misses Janet Williams, advertising; Evelyn Strickland, secretary, and George H. Bell, auditing department. Center: Portion of liquid plant. Right: George Coats, Clayton plant operations manager.

forms the functions of both president and treasurer of the company.

Although the plant is at Clayton, N.C., as mentioned earlier, executive offices are maintained in the W. R. Peele Bldg., in Raleigh. Manager and expediter at the Clayton plant is George Coats whose responsibilities include operation of both the liquid and dry phases of the plant's production. In addition to Mr. Peele in the office are Misses Janet Williams and Evelyn Strickland who handle advertising and secretarial work, respectively; and George H. Bell, auditor.

W. R. Peele Co. is well known throughout its trading area as a forward-looking organization. Growers of tobacco and other crops in the area have long come to take seriously the "Pelco" slogan that its product "Takes the Bugs Out of Farming."

Joins National Safety Council Fertilizer Staff

CHICAGO—John Nahikian has joined the staff of the National Safety Council and has been assigned to the Fertilizer Section as staff representative, the NSC has announced. Mr. Nahikian was formerly with Clayton & Lambert Manufacturing Co., Louisville, Ky., where he held the position of assistant personnel manager and safety director.

The fertilizer section of NSC will hold an executive committee meeting on June 4 at Hotel Roanoke, Roanoke, Va., it has been announced. At that time the committee plans to organize, standardize and present five regional safety schools for supervisors in the fertilizer industry.

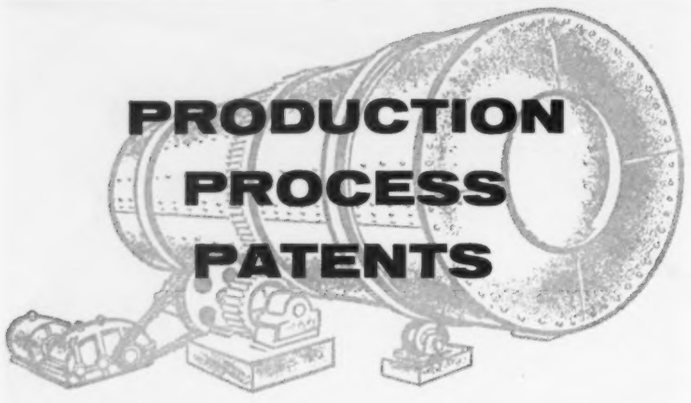
Plans will also be made for participation in the 47th National Safety Congress and Exposition scheduled to be held in Chicago in October.

Towmotor Announces Personnel Changes

CLEVELAND, OHIO — Towmotor Corp. has announced a number of changes among its executive personnel. Galen Miller, formerly vice president and treasurer, has been made executive vice president; Harold E. Boehm is now treasurer and is succeeded in his former office of controller by Dave Quere, formerly assistant controller.

Richard S. Wentz, recently appointed factory manager was elected vice president and Lee Cirillo, formerly manager of field application, is now director of new product research.

The announcements were made jointly by Lester M. Sears, chairman, and C. E. Smith, president of Towmotor.

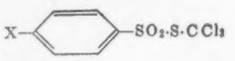


2,882,141

Slow-Acting Fertilizer Compositions. Patent issued April 14, 1957, to James M. O'Donnell, Woonsocket, R.I., assignor to Nitro-Form Agricultural Chemical Co., Woonsocket, R.I. A slow-acting high-level polymeric fertilizer composition comprising (a) a urea-formaldehyde resin as a major component and (b) an ethylene amino carboxylic acid compound integrally admixed in the polymer in the amount of about 2-20% by weight of said composition.

2,882,196

Pesticidal Compositions. Patent issued April 14, 1959, to Glentworth Lamb, Stamford, and Elton L. Clark, Bethel, Conn., assignors to American Cyanamid Co., New York. A pesticidal composition comprising as active toxic ingredients from about one to about 30 parts by weight of a trichloromethyl benzenethiosulfonate compound of the formula



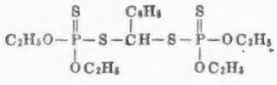
wherein X represents a member of the group consisting of Cl and CH_3 for each 30 parts of 0,0-diethyl S-ethylthiomethyl phosphorodithioate.

2,882,197

Sulfurized Alkyl Thioformal Fungicidal Compositions. Patent issued April 14, 1959 to Irving D. Webb, Yorba Linda; Carleton B. Scott, Pomona, and John W. Yale, Yorba Linda, Cal., assignors to Collier Carbon and Chemical Corp., Los Angeles. A fungicidal, bactericidal and nematocidal composition comprising an inert pesticidal carrier material and, as the essential active ingredient, a sulfurized alkyl thioformal product obtained by heating a mixture comprising elemental sulfur and an alkyl thioformal selected from the class consisting of dimethyl thioformal and diethyl thioformal at a temperature between about 85° C. and about 200° C. for a period of time between about 0.67 and about 5 hours, said mixture containing between about 1 and 15 atomic weights of elemental sulfur per molecular weight of said alkyl thioformal and said sulfurized product containing between 1 and about 15 atoms of chemically bound sulfur per molecule of said alkyl thioformal.

2,882,198

Pesticidal Phosphorus Esters. Patent issued April 14, 1959, to Joe R. Willard and John F. Henahan, Middleport, N.Y., assignors to Food Machinery & Chemical Corp., New York. A pesticidal composition comprising as an active ingredient a toxic concentration of the compound bis(S-[diethoxyphosphinothioyl] mercapto) (phenyl)methane of the formula



and an inert pesticidal adjuvant as carrier therefor.

2,883,319

Pesticides. Patent issued April 21, 1959, to Abraham Bavley, Brooklyn, and Donald P. Cameron, Bronx, N.Y., assignors to Chas. Pfizer & Co., Inc., Brooklyn, N.Y. A compound selected from the group consisting of 2-dialkylthionophosphonothio substituted ethyl and 3-dialkylthionophosphonothio substituted propyl fully esterified esters of di- and tricarboxylic acids, the carboxyl groups of said acids being attached to different carbon atoms of a straight chain residue containing up to four carbon atoms and selected from the group consisting of alkyl, alkylene and monohydroxylated alkyl and alkylene, the alkyl groups of said dialkylthionophosphonothio substituents containing up to four carbon atoms. A method of killing mites which comprises contacting said mites with the compound.

2,883,321

Fungicidal Composition Comprising the Reaction Product of a Phenylhydrazine with Carbon Disulfide, and the Method of Preparation. Patent issued April 21, 1959, to Van R. Gaertner, Dayton, Ohio, assignor to Monsanto Chemical Co., St. Louis, Mo. A nitrogenous organic compound selected from the class of the 1:1 carbon disulfide-1(2-aminoethyl)-2-phenylhydrazine addition product obtained by contacting 1-(2-aminoethyl)-2-phenylhydrazine with carbon disulfide, the dehydrosulfurization product obtained upon heating said 1:1 addition product at a temperature at which hydrogen sulfide is evolved, the crystalline solid $C_8H_{11}N_3S$ compound recovered from said dehydrosulfurization product, and the gum-like residue remaining after recovery of the solid $C_8H_{11}N_3S$ compound from said dehydrosulfurization product.

2,881,066

Process for Producing Nitrogenated and Phosphorylated Fertilizer, Mulch and Soil Conditioner. Patent issued April 7, 1959, to Reavis C. Sproull and Clarence D. Cone, Jr., Savannah, Ga., assignors to Southern Lumber Co. In a process for producing a combined fertilizer, mulch and soil conditioner, the steps which comprise chemically reacting comminuted wood-like material with an aqueous solution of urea and phosphoric acid at a temperature of from 80° to 100° C. whereby water insoluble nitrogen and phosphorus compounds are chemically bonded within said material.

2,881,053

Process for Removing Inert Gases from Ammonia Synthesis Gas. Patent issued April 7, 1959, to Frederick A. Bowers, Cactus, Texas, assignor to Phillips Petroleum Co. In a system for the synthesis of ammonia wherein nitrogen and hydrogen, contained in a first mixture of gases comprised of nitrogen, hydrogen, methane, helium and argon, are reacted in the presence of a catalyst in a reaction zone under ammonia producing conditions to form an ammonia product which is subsequently liquefied and wherein unreacted cycle gases containing nitrogen, hydrogen, and a mixture of gases inert to said reaction comprising methane, helium, and argon are recycled to said reaction zone, the steps of: contacting said cycle gases with a portion of said liquid ammonia product in an absorption zone; preferentially absorbing methane from said mixture of gases inert to said reaction; and increasing the partial pressures of remaining said gases inert to said reaction to the extent that additional gases inert to said reaction are absorbed in said absorbent.

2,880,131

Hexa - Hydrocarbylphosphoramide Solvents for Halogenated Aromatic Insecticides. Patent issued March 31, 1959, to Samuel C. Camp, Gibsonia, and Donald R. Stevens, Wilkinsburg, Pa., assignors to Gulf Research & Development Co., Pittsburgh. A substantially odorless insecticidal composition having improved solubility and residual toxicity characteristics comprising a halogenated aromatic insecticide toxicant, a petroleum hydrocarbon solvent as a carrier therefor and as an accessory solvent a normally liquid hexa-hydrocarbylphosphoramide.

2,880,132

Rodenticidal Compositions Comprising a 2-Acyl 1,3-Indandione and an Ethylene-Diamine Tetraacetate. Patent issued March 31, 1959, to Morton Schwarcz, Highland Park, Ill., assignor to Morton Chemical Co., Chicago. The composition of matter comprising an alkali metal salt of ethylene-diamine tetraacetic acid and an alkali metal salt of a 2-acyl 1,3-indandione.

2,880,063

Process for the Preparation of Phosphoric Acid. Patent issued March 31, 1959 to Abraham Baniel and Ruth Blumberg, Haifa, Israel, assignors to Makhtsavei Israel, Tel Aviv, Israel. A process for the preparation of aqueous phosphoric acid, comprising mixing a comminuted tricalcium phosphate containing material with aqueous hydrochloric acid in an amount which is in excess over the equivalent of the phosphoric acid content of the tricalcium phosphate containing material, in order to form an aqueous solution containing calcium chloride, hydrochloric acid and phosphoric acid, the latter being present in said aqueous solution in a concentration equi-

Turn to PATENTS page 25

Arcadian® News

Volume 4 | For Manufacturers of Mixed Fertilizers | Number 4

Are You Taking Full Advantage of Nitrogen Division Service?

During your rush season and in any season, Nitrogen Division, Allied Chemical, is better equipped than any other nitrogen producer *to serve you.* Here are three important reasons why—

1 Technical Assistance

To provide its customers with competent, well-qualified technical assistance, Nitrogen Division maintains the largest, best-trained, most-experienced staff of fertilizer technologists in the industry. This staff includes hundreds of fertilizer technicians, scientists and engineers working with millions of dollars worth of laboratory and pilot plant equipment.

These men are ready, willing and able to help you find the practical answer to your formulation, ammoniation and manufacturing problems. The accumulated skill of many years of experience augments your own efforts. And this service is available to customers without charge.

Nitrogen Division technical men work on your problem in your plant or in their laboratories using the most modern facilities. They are skilled in ferreting out trouble spots and in helping you to quickly correct operating techniques.

Remember, Nitrogen Division technologists originated and developed nitrogen solutions and the practice of ammoniating superphosphate. They have the *know-how* that counts when you need help fast!

2 Production Capacity

Long-time leading producer of fertilizer nitrogen, Nitrogen Division owns and operates three huge plants—at Hopewell, Virginia; South Point, Ohio; and Omaha, Nebraska—by far the biggest nitrogen production capacity in the country. And, Nitrogen Division offers the most complete line of nitrogen products available to the fertilizer manufacturer.

Look over the list of ARCADIAN® Nitrogen Solutions and other ARCADIAN Nitrogen Products on page 4 of this issue of ARCADIAN NEWS. No other nitrogen producer is so well prepared to supply your complete nitrogen needs. You can get the exact nitrogen products you want from Nitrogen Division—and *all* your nitrogen from one source.

3 Delivery Facilities

Getting your order to you on time for you to meet production schedules is standard procedure for Nitrogen Division. Its three plants are strategically located for fast shipment to fertilizer manufacturers, with the aid of the largest fleet of tank cars in the industry plus many tank trucks. A widespread network of "in-transit" storage points is maintained, where fully-loaded tank cars sit on railroad sidings ready to move immediately for fast deliveries.

All Nitrogen Division facilities are closely linked by teletype, direct private phone and other methods of rapid communication. Every provision is made to expedite your orders—to get your nitrogen rolling to you immediately.

Nitrogen Division has the products and the people to serve you best! Why not see how well this service operates? Contact: Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N. Y. Phone: Hanover 2-7300. Or call one of the 12 other offices listed on page 4 of this issue of ARCADIAN NEWS.

Grazing and Silage Crops Thrive on 2-1-1 Ratios

Don't let the outstanding success of 2-1-1 ratio fertilizers for corn blind you to the late spring opportunities for extra sales on *other* grass crops. Yes, corn is a specialized kind of grass. Other grass crops are like it in needing high-nitrogen mixed fertilizers to produce big, profitable yields.

When you provide your dealers with 16-8-8, 14-7-7 and other top-notch corn fertilizers, advise them to top off the corn season with the grass market. Sure, early spring is the time many pastures are fertilized. But they need nitrogen and other plant food again after the first flush of growth has been grazed or cut.

When high-nitrogen fertilizer can make grass produce 6 to 8 tons of milk per acre, and 400 to 800 pounds of beef per acre, there's money in fertilizing the crop. It will pay to get your share of it. Remember, most farmers get less than a ton of milk per acre of ordinary pasture, and 75 to 150 pounds of beef per acre of ordinary grass.

Grass pastures and hayfields produce the best tonnage of protein-rich feed when they get several applications of fertilizer per year. Instead of a heavy dose of 0-20-20 followed by 2 or 3 nitrogen top-dressing applications, farmers can use a 2-1-1 ratio mixed fertilizer three times a year. May and early June, after the first crop is off, is a fine time to get mixed fertilizer on grassland. Demonstration strips fertilized with 16-8-8 or similar fertilizer will open the eyes of many a farmer to his need for grassland fertilizer.

Summer grazing crops, like sudan grass and millet, yield tons of good feed per acre when they get fertilizer. Your 2-1-1 mixed fertilizers are ideal to make these warm-weather crops get up and grow.

PROPOSED CHANGES IN FERTILIZER GUARANTEE LAWS

Bills have been introduced in the State Legislatures in Maine and Minnesota, which, if approved, would require that the phosphorus and potash content of fertilizer be guaranteed on an elemental rather than the present oxide basis. Plans to introduce similar bills this year are reported to be under way in several other states. Preliminary hearings have already been held on the proposed changes by the Maine and Minnesota legislatures. Little, if any, publicity has been given to this activity in trade papers and it is reported that few fertilizer manufacturers had representatives present at preliminary hearings.

It behooves all fertilizer manufacturers to follow this development closely. If you market within a state in which elemental guarantees have been or will be proposed, you will want to evaluate the effects of such changes on your business and keep State Legislatures and trade associations advised of your position.

Technical Tips

QUALITY CONTROL

In the early years of the fertilizer industry, the producer got just as much quality out of his production as he put into it. In fact, the long "curing" process that was the custom, then, often *improved* the product.

But this is no longer true. Today, the use of new and more concentrated ingredients to make higher analysis fertilizers *plus* the emphasis on speed to fill volume orders, has made quality more elusive. If equipment and techniques are not carefully watched and maintained for peak performance, finished goods will not contain *all* the nitrogen that is put into the mix. The producer should not delude himself into thinking that the mere adding of costly, complicated equipment and certain new materials will solve his quality problem. It may, if he's not careful about operation, simply create new and more serious difficulties.

Common Errors in Technique

One of the traps that the unwary producer may fall into is the striving for low moisture content of granulated fertilizer by permitting excessive heat in the storage pile. This can result in "bag set" —the very thing the producer is trying to avoid through low moisture content. In addition, if carried to extremes, this preoccupation with minimum moisture can cause release of undesirable fumes from the dryer, with some loss of nitrogen.

Another common fault is to attempt to save time by speeding up the ammoniation process. The problem is that in high rates of ammoniation, the heat of the mass causes the last portion of nitrogen solution being introduced to give up its ammonia in the form of gas. For obvious reasons, this is the part of the action that cannot be hurried in any system, and still maintain adequate control. Unfortunately, this time period is the most obvious to producers, and the one they usually try to shorten to speed up mixing time. They would be better advised to save time by adding the *first* portion of the ammoniating medium more rapidly. This can be done in most systems, including continuous types.

Still another error is to try to save time by not using the holding hopper ahead

of the batch mixer. This can only lead to robbing essential operations of vital time allotments.

Some producers actually go so far as to remove screens to speed up production. As a result, the lumps of ingredients deprive the process of the intimate contact on which so much depends. Where the lumps are superphosphate, the effect on ammonia take-up, as well as on physical quality, is well-known. Even with screening, an unreasonably fast operation with very lumpy materials can cause irregular concentration in the mass. What happens is that too long a holdup at the sizing mill prevents some of the materials from returning to the batch in time.

Let Sampling Help, Not Hinder

If the physical mixing and chemical combining of mixed fertilizer were 100% efficient, then undisciplined (easy-way) sampling would be acceptable. But the pressure for tonnage alone is such that perfection in these two areas is not compatible with the other economics of the fertilizer business. Thus, as operations depart further from perfection, the operator is forced to rely more and more on sampling as a check on his production. It goes without saying that the producer should make every effort to sample *correctly*.

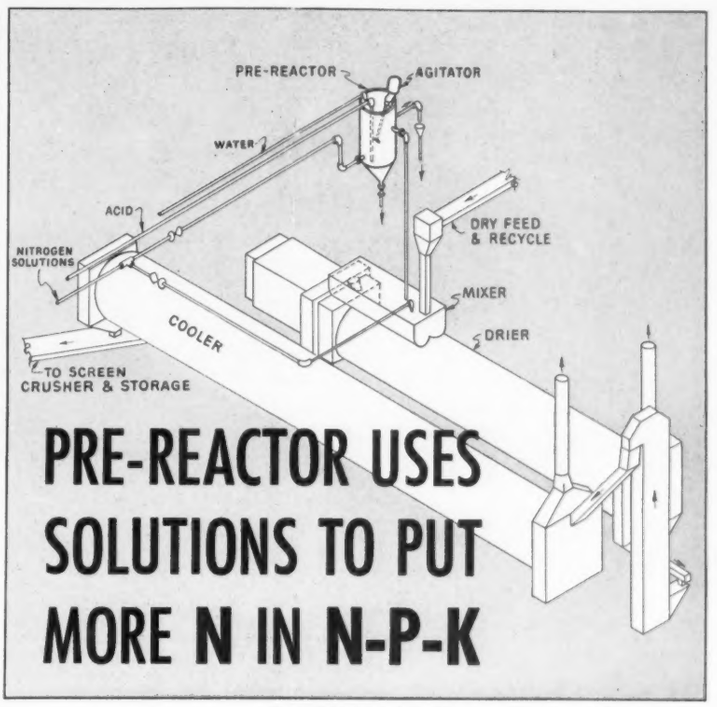
For example, when sampling every batch, the producer should be careful not to take samples from the same region of the discharge every time. Obviously, the analysis of this total sample indicates only the amount of plant foods in that particular portion of the batch, which may or may not be representative of the entire mass.

Again, taking several samples during the discharge of a single batch is almost as bad a practice. Here, the total sample usually contains an unduly large proportion from the slow discharge rate part of the cycle. So, take your samples properly, and they will give you a true picture of what you are producing.

Weather Forecasts

Nitrogen Division has begun distribution of monthly weather forecasts to its customers all over the country. The forecast for each month will be mailed about a week before the month begins. Weather is one of the most important factors in the fertilizer business and the new service should be helpful in making plans.

The forecasts, said to be 80% accurate, are prepared for Nitrogen Division by Weather Trends, Inc., one of the oldest private weather forecasting services in the nation. In addition to a summary giving over-all weather predictions, each forecast will include colored charts and maps showing expected precipitation and temperatures in each section.



PRE-REACTOR USES SOLUTIONS TO PUT MORE N IN N-P-K

Typical high-analysis fertilizer operation with pre-reactor.

Until recently, getting maximum use out of nitrogen solutions in making high-analysis fertilizer has been limited by the amount of acid that could be added to the mix without developing excessive heat in the liquid phase. But now, with the new technique of using a *pre-reactor*, every producer can formulate 2-1-1, 3-2-2 and other high ratios with safety and precision.

No Acid in the Mix

This new technique involves keeping all acid out of the mix—confining it to the pre-reactor, along with the nitrogen solution. Here, the acid neutralizes the free ammonia in the nitrogen solution. The heat generated by this reaction is dissipated through evaporation of water by the pre-reactor. In some formulations this function of "drying out" in the pre-reactor assumes even greater importance.

Makes Production More Precise

The pre-reactor has further value in that it gives the producer greater control over heat and water content in the mix. By adding water to the pre-reactor at an easily determined rate, he can maintain a constant temperature that provides a slurry of uniform nitrogen and water content to feed the mixer. In effect, by using a pre-reactor, the producer can efficiently neutralize all the ammonia in excess of that which is necessary for ammoniation of the superphosphate. In view of this, it is obvious that the new pre-reactor technique will prove to be a most valuable aid in the producer's never-ending fight to maintain quality in volume production.

Cuts Costs, Increases Profits

In addition to the foregoing benefits in safety, precision and greater control, the use of a pre-reactor gives the producer a unique economic advantage. For, getting all his nitrogen from low-cost Arcadian Nitrogen Solutions can add a big plus to net profits. As the sketch shows, there is nothing complicated about incorporating a pre-reactor in a normal high-analysis granulation operation. The same standard equipment is used . . . nothing is eliminated. Take advantage of the new pre-reactor technique for making high-analysis fertilizers . . . you'll *like* the difference in your volume, quality and profits! For complete details—without obligation—on how to put a pre-reactor into your present granulation setup, write: Technical Service, Nitrogen Division, Allied Chemical Corporation, 40 Rector Street, New York 6, N. Y.

HERE'S THE BIG LINE OF Arcadian® NITROGEN SOLUTIONS

When you purchase your nitrogen requirements from Nitrogen Division, Allied Chemical, you have many different nitrogen solutions from which to select those best suited to your ammoniation methods and equipment. You are served by America's leading producer of the most complete line of nitrogen products on the market. You get formulation assistance and technical help on manufacturing problems from the Nitrogen Division technical service staff. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions.

	CHEMICAL COMPOSITION %						PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Neutralizing Ammonia Per Unit of Total N (lbs.)	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®									
2	41.0	22.2	65.0	—	12.8	10.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	10.8	1.147	18	15
3	41.0	26.3	55.5	—	18.2	12.8	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	12.7	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	12.6	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	8.9	1.184	1	56
4M	41.0	19.0	72.5	—	8.5	9.2	1.194	7	61
6	49.0	34.0	60.0	—	6.0	13.9	1.050	48	-52
7	45.0	25.3	69.2	—	5.5	11.2	1.134	22	1
URANA®									
6C	43.0	20.0	68.0	6.0	6.0	9.3	1.180	12	39
6M	44.0	22.0	66.0	6.0	6.0	10.0	1.158	17	14
10	44.4	24.5	56.0	10.0	9.5	11.0	1.114	22	-15
11	41.0	19.0	58.0	11.0	12.0	9.2	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	11.7	1.087	25	- 7
13	49.0	33.0	45.1	13.0	8.9	13.5	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	12.7	1.052	29	1
U-A-S®									
A	45.4	36.8	—	32.5	30.7	16.2	0.932	57	16
B	45.3	30.6	—	43.1	26.3	13.5	0.978	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	24.3	0.618	211	-108

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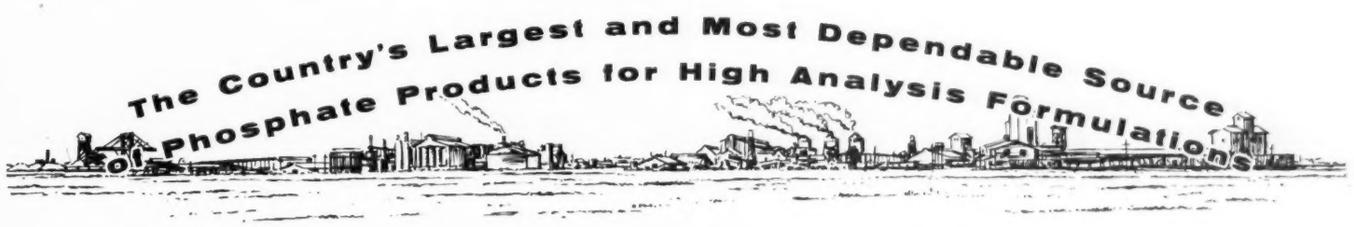

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Management and Employees Have Mutual Stake in More Effective Safety Program

By G. F. MacLeod
Sunland Industries, Inc.
Fresno, California

TOO OFTEN EXPRESSED and too often put into practice, is the belief that "safety is something the other fellow is concerned about . . . but not particularly ourselves."

Management is composed of a group of human beings who work among hazards common to all men, but attach special concern to the safety of their fellow workers. There are many good reasons for this concern. Management has a sizeable stake in placing emphasis on safety.

Profits in the fertilizer business are limited by narrow margins. It takes the sales of many tons of fertilizer to pay insurance premiums. Salaries have to come out of the same pocket. Accidents cost money and cut profits.

A good safety record makes for good labor relations. No man wants to work with a careless joker. A company prone to accidents reflects on management and creates discontent all around.

Within the community where plants are located, companies get the name of being a "good" or a "bad" place to work. The safety of a plant is a major contribution to good public relations and a good labor supply.

Of greatest importance is the fact that no good manager, superintendent, or boss wants to have on his conscience the fact that a breadwinner has been injured and a family is suffering as a result. Accidents breed discontent as well as discomfort.

Safety Begins With Living

You cannot expect all people to be equally conscious of the importance of safe working habits. In a chemical plant safety begins with the interview of a prospective worker. Every plant should have a definite interview form which the hiring agent should use. He needs to know the job-seeker's health. A pre-employment physical can save trouble later.

The reaction time, sensory perception, alertness and habits should all be observed and recorded. Sample forms and tests covering areas of both temperament and ability are widely available. Some people are just naturally poor safety risks.

The best interview needs to be followed by a telephone check with former employers. For this a set of questions aimed at getting pertinent information can be formulated and used as standard procedure for hiring. It takes both thought and tact to avoid hiring somebody else's cripples. On the other hand, handicapped people often make the safest workers.

The Gang's All Here

It is not difficult for any alert man to detect the characteristics which distinguish a safe worker from one who is a liability. Here are a few well-known hazardous characters:

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9. Swivel-necked Sam—More interested in where he's been than where he's going.
10. The Glad Rag Boy—Wears floppy, torn clothes to prove he's tough and needs a raise.

Eternal vigilance is the price of survival in a chemical plant. The products are dusty, the fumes corrosive and often inflammable or explosive. Footing sometimes gets uncertain and visibility may be lowered. Fertilizer machinery is heavy with massive drives, powerful motors and big moving parts which can produce more severe injuries than lighter equipment. Care is a must, not an alternative.

It is of the utmost importance that every man and woman in any business today recognize the need to be eternally vigilant, alert and on guard both for their own sake and the sake of their colleagues. There is neither reward nor recompense for injury. Safety is a state of mind that is everybody's business.

More Accuracy and Precision in Analyses Objective of Better Statistical Methods

By Dr. Vincent Sauchelli
Chemical Technologist
National Plant Food Institute

DISCUSSIONS at the 1957 and 1958 annual conferences on chemical control problems sponsored by the National Plant Food Institute have pointedly shown that chemists in fertilizer control laboratories could use statistical methods profitably in dealing with analytical data.

Modern statistical techniques have a great deal to offer chemists in experimental or applied chemistry. Statistical techniques enable one to describe in quantitative terms the accuracy and precision of his methods and results.

They also enable the chemist in charge of the fertilizer control laboratory to advise the superintendent, by means of statistical quality control charts, that a trend was starting or was already in effect in the process that could result in a deficiency or serious overage of nutrients in the final product. This advance warning would permit correction of the cause before it became serious and costly. He also would be enabled to check the accuracy and precision of his laboratory methods and results.

Progressive chemists are first to familiarize themselves with the importance of these new techniques; younger chemists would be well repaid to study and master the principles. Unfortunately, all schools and colleges do not include courses in statistical methods and techniques in connection with their studies in quantitative chemistry; too many stop short with a brief study on the theory of error.

Many branches of the chemical industry are using statistical quality control effectively as one means of reducing the unit cost of production. This new technique has been defined as "the application of statistical principles and techniques in all stages of production directed toward the most economic manufacture of a product that is maximally useful and has a market." Such a definition certainly includes the plant food industry. Many management officials in our industry are investigating the claims made for statistical quality control as an aid to efficiency of operation and lowering the cost of production. Having convinced themselves of the reasonableness of these claims, management properly urges its supervisors of chemical control and operation to learn and apply these new techniques as routine in their daily work.

Recently I received an interesting report from a colleague on how he had applied statistical quality control successfully in his department. Convinced of the merits of this new aid he looked around to find where he could apply it in his chemical plant. His first study was in the quality control laboratory. He knew that management usually accepted the laboratory test results to explain any variation in the process. But from his knowledge of the fundamentals of quality control he pointed out to his superiors that three other major factors exist which in themselves can seriously vitiate the laboratory test results. These other factors he enumerated as follows:

1. **Variations in sampling;**
2. **Variation in testing equipment; and**
3. **Variation in the laboratory analysts.**

From his experience and knowledge of routine laboratory testing he knew that in many cases the sum of these variations or errors in testing was much larger than the actual variation in the process. Simply by using the technique of frequency distribution and the control chart it is possible to control the accuracy and precision of the chemical and physical tests. The charts quickly show any excessive variation in the test or in the process and indicate the trend of the data. This colleague is using statistical quality control as routine in measuring variations in the mixing of raw fertilizer materials and in bag filling. He adds he would never again operate without it.

Since 1922 many control chemists in state and industry chemical laboratories have participated in the Magruder check fertilizer sample work. This is a general plan designed primarily to enable a chemist to check the effectiveness of the methods and techniques of his laboratory with those of many other chemists. The scheme was initiated by E. W. Magruder in 1922, when he was chief chemist for the F. S. Royster Guano Co. Starting with about 30 participants the number reached 129 in the past year.

As a result of the growing desire among many chemists to derive much more benefit from the plan by means of statistical techniques, the plan has been revamped in the interest of this modern tool and the new series of check fertilizer samples was inaugurated this past January. Advantage will be taken of the mathematical basis developed for making sharper and sharper comparisons of the analytical results compiled from the returns of the collaborating laboratories.

Under the previous plan each participating laboratory reported the average analysis of the monthly fertilizer sample. However, he did not report the number of determinations such an average represented. Since only averages were reported and no standardization had been established as to the number of individual results that should go into the averages or no information given on individual results, it was not possible to make a mathematical analysis of the data.

The revised check sample series requires each laboratory to report on duplicate determinations for each sample, that is, only two separate determinations are to be made, each on different days. The analytical work required is no greater than previously and the reporting is to be on each of the two individual analyses instead of the average of analyses. These small changes will make a great difference in the proper interpretation of the results.

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3	6.05	.20	3.14	.02	9.94	.08	.58	.03	9.36	.11	11.89	.06
4	6.80	.00	3.08	.03	9.63	.00	.68	.04	8.94	.06	11.94	.09
5	4.95	.10	3.13	.08	10.05	.00	.60	.16	9.45	.16	12.03	.00
Grand Avg.	6.15	.12	3.15	.04	9.83	.06	.60	.08	9.22	.14	12.00	.07
Standard Deviation ..	.87	.09	.05	.03	.19	.05	.05	.06	.20	.10	.32	.05

will be possible to determine the overall accuracy and precision of each participating laboratory. Under the previous plan it was not possible to specify how the average of a particular laboratory compared with the grand average of all the results or with that of any one other laboratory. Statistics can do this only when the average individual results are based on the same number of determinations. Uniformity in the number of times each laboratory repeats an analysis makes it possible to measure precision and to compare the precision of one laboratory with that of another and with the grand average precision of the lot.

The statistician can calculate, by means of a simple formula, the limits on each side of the grand average within which accurate results will fall and beyond which the results will show a bias. The formula gives him what is termed "a standard deviation" which he then uses as a yardstick to judge whether a result should be considered a normal part of a larger group of similar results or whether the probability exists that this particular result is different.

The limits of one standard deviation on each side of the grand average will include 68.3% of the results reported by all the laboratories. Limits of two standard deviations from the grand average will include another 27.1% or a total of 95.4%; while, three standard deviations will include a total of 99.7% of all the results. A substantial difference from the grand average denotes that the result is biased. One result falling within the three standard deviation area could be due to chance; but when more than one result occurs, the indication is that the laboratory responsible should improve its precision and then study for the sources of the bias.

To illustrate how the determinations from the collaborating laboratories will be analyzed statistically the accompanying tabulation will be helpful. Results from five laboratories are shown: each laboratory furnished the required data. Then the average and the difference or range between the two determinations were calculated. Next, a grand average was derived from the determinations and the average range. There followed the calculation of the standard deviation of the average and of the ranges.

The standard deviation is the yardstick with which to judge whether a given result is to be considered a normal part of a larger group of similar results or whether it is highly probable that it is different. This is where the concept of limits of one, two or three standard deviations comes into play. Comparing the data at the bottom of each column in the report with the range of a laboratory's analysis informs one how the precision of that laboratory compares with the average precision of all laboratories.

If the range is consistently smaller than the average range the laboratory shows it has a higher degree of precision; or if, consistently larger, it has a poorer precision. The table illustrates these concepts. We are indebted to E. W. Glocker of W. R. Grace & Co. for its use. The data represent the actual analyses of a 3-10-12 grade and the tabulation illustrates the new method of reporting the results.

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If the average lies within one standard deviation from the grand average and the range is at least as small as the average range the laboratory involved can be satisfied and nothing needs to be done.

If the average lies outside the area of two standard deviations from the grand average but the range is at least as small as the average range, a bias is indicated and the supervisor should seek for the cause. Nothing needs to be done regarding precision.

If the average lies within the area of one standard d[illegible] the grand average, but the range is greater than two sigmas of the average range, lack of precision is indicated and bias is to be suspected.

If the average lies outside the area of two standard deviations from the grand average and the range is greater than two standard deviations from the average range, the supervisor should look for the reasons underlying the bias and the imprecision.

When the average or range of both these magnitudes lies beyond the three standard deviations area, bias and imprecision exist and correction is urgently indicated.

The preparation and distribution of the Magruder check samples, their chemical analysis, the statistical study of the analysis data, the final compilation of the data and its distribution to all participating laboratories represent a large amount of careful work. This becomes a service to analytical laboratories which in time can become a most potent influence in improving the over-all precision and accuracy of all laboratories and of the practicing chemists. This work deserves the wholehearted support of all chemists and laboratories serving the fertilizer industry and the unstinted support of management if for no other reason than enlightened self-interest.

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New Sticker-Spreader Introduced by Allied

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Issued under the trade name "Plyac," the product is said to be non-oily and mixes well with commonly-used spray materials. Being nonionic, the product is not affected by hard water, does not react with other chemicals and is compatible in a wide variety of mixtures, Allied says.

California Plant Construction Continues

SAN FRANCISCO — Construction continues ahead of schedule on the new $9.5 million plant of Valley Nitrogen Producers, Inc., according to Louis A. Rozzoni, president of the California Farm Bureau Federation and director of the fertilizer producing cooperative.

The contract for the construction of the plant was awarded to Chemical Construction Co., New York. A contract has been signed with the Pacific Gas and Electric Co. to provide over 12,000,000 cubic feet of gas a day to the new plant. P. G. & E. is building a new six-inch gas main, 5,000 feet long.

New Appointment

NEW YORK—B. C. Drumm, sales manager of the Multiwall Bag Dept., Hudson Pulp & Paper Corp., has announced the appointment of John F. Farley as district manager for multiwalls in the greater New York area.

Mr. Farley has had extensive multiwall experience. Prior to this new assignment he had been employed by Hudson as a specialist in the development and introduction of new bag types and constructions.

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Sunland Industries, Inc.
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Issued under the trade name "Plyac," the product is said to be non-oily and mixes well with commonly-used spray materials. Being nonionic, the product is not affected by hard water, does not react with other chemicals and is compatible in a wide variety of mixtures, Allied says.

California Plant Construction Continues

SAN FRANCISCO — Construction continues ahead of schedule on the new $9.5 million plant of Valley Nitrogen Producers, Inc., according to Louis A. Rozzoni, president of the California Farm Bureau Federation and director of the fertilizer producing cooperative.

The contract for the construction of the plant was awarded to Chemical Construction Co., New York. A contract has been signed with the Pacific Gas and Electric Co. to provide over 12,000,000 cubic feet of gas a day to the new plant. P. G. & E. is building a new six-inch gas main, 5,000 feet long.

New Appointment

NEW YORK—B. C. Drumm, sales manager of the Multiwall Bag Dept., Hudson Pulp & Paper Corp., has announced the appointment of John F. Farley as district manager for multiwalls in the greater New York area.

Mr. Farley has had extensive multiwall experience. Prior to this new assignment he had been employed by Hudson as a specialist in the development and introduction of new bag types and constructions.

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Urea-Ammonia Solutions Found to Be Safe in Pre-Neutralized Ammoniation

By Dr. Frank G. Keenen
E. I. du Pont de Nemours & Co., Inc.
Wilmington, Del.

SOME PUBLICITY has been given recently to the possibility of toxic gases being evolved when ammoniating solutions containing urea were mixed with sulfuric acid in the pre-neutralization step of certain fertilizer granulation processes. (Croplife—Jan. 19, 1959—and NPFI News Report No. 21, 1958). Since this differs from our twenty-five years' experience with urea ammonia liquors (DuPont "Uramon" ammonia liquors), clarification of this situation appears to be desirable.

Facts have been established as follows:

1. Urea solutions containing no ammonium nitrate give off only harmless carbon dioxide when added to strong sulfuric acid. Further, relatively insignificant hydrolysis of the urea occurs (less than 10%) even up to one hour at temperatures of 220°-250° F. in the neutralizing vessel.

2. When ammonium nitrate is added to urea solutions, a different set of chemical reactions occurs. Mixing an ammonium nitrate-urea solution with sulfuric acid generates copious and nearly equal amounts of nitrous oxide (N_2O) and carbon dioxide, along with small amounts of nitrogen dioxide (NO_2). Nitrous oxide is the gas widely used for light anesthesia and is commonly called "laughing gas." Also, the presence of ammonium nitrate greatly aggravated urea breakdown to the extent that the urea was almost completely destroyed under the conditions of pre-neutralization used.

3. Ammonium nitrate solutions containing no urea give off only small amounts of mixed nitrogen oxides during pre-neutralization.

Therefore, undesirable conditions are caused, not by urea alone, but by the combination of urea and ammonium nitrate. From an operational standpoint, the evolution of nitrous oxide represents a definite loss of nitrogen from the system and could possibly account for the reported physiological effects on operating personnel.

These data have been developed in a laboratory "pre-neutralizer" unit from which the gases given off were collected and analyzed by mass spectrographic and infrared techniques. A complete materials balance (input=output) was made on each run, and the final contents of the pre-neutralizer were identified.

The ammoniating solution was introduced into well agitated 95% sulfuric acid with appropriate temperature control so that the contents were maintained between 200-260° F. throughout a "run." Gas samples were taken near the beginning and the end of each run. While the data which follow are averages of the actual readings, the differences between readings were relatively small.

Urea-Ammonia Solutions

The "Uramon" ammonia liquor-B (UAL-B) used in these experiments has the following composition: 30.5% ammonia, 43.3% urea, 10% water, and 10% carbon dioxide. In each "run," approximately 150 parts UAL-B were added to 300 parts of 95% sulfuric acid during a one-hour period at an average temperature of 240° F. Analysis of the partly-neutralized acid by the urease enzyme method showed 92% of the urea added remained unchanged. No loss of nitrogen occurred. The small amount of ammonia formed by urea hydrolysis was absorbed by the acid, and all of the nitrogen added was found in the liquor.

The gas given off analyzed 99.9% carbon dioxide, and its weight checked almost exactly with the carbon dioxide initially contained in the "Uramon" ammonia liquor plus that formed by the hydrolysis of 8% urea. No indications were found in the

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EDITOR'S NOTE

In the Production Edition of Jan. 19, 1959, Croplife carried a story by Joseph C. Sharp, Spencer Chemical Co., describing toxic gases involved in certain phases of the ammoniation process.

In a letter to the editor, Mr. Sharp brings his observations up to date, based on subsequent studies and tests. We thought it pertinent to present the comments of Mr. Sharp to our readers in connection with the accompanying article by Dr. Keenen of DuPont.—Ed.

Mr. Sharp's letter follows:

"It has come to our attention that recent experimental work, utilizing a urea-ammonia solution for pre-neutralization, supplements and sheds new light on an article which I contributed to your Jan. 19 Production Issue.

"This article told of work done at our mixed fertilizer demonstration unit indicating that a toxic gas might be produced when urea was used as 'all or any part of the nitrogen source in pre-neutralization.'

"It should be noted that this work, which gave evidence of hazardous gas, utilized a urea-ammonium nitrate solution. More recent work indicates no pre-neutralization hazards when using a urea-ammonia solution.

"Our concern, upon finding the hazards outlined above, was to let the industry know as soon as possible. We feel that this concern was justified but are happy that supplemental work by DuPont has found urea-ammonia solutions to be a safe nitrogen source in pre-neutralization."

moves up to 50% more for Virginia-Carolina Chemical Corp.

"On the shipping work the model H-25 does the job previously handled by two model HA's — moves up to ½ as much again as each HA", says Supt. Geo. Eversman, Supt. of V-C's Ft. Wayne, Indiana plant.

"Its ability to dig in extreme hard, compacted material and carry larger loads reduces the number of machines operating in the plant and eases the traffic problem. Repairs have been minor with minor adjustments and a minimum loss of time."

Virginia-Carolina Chemical Corporation has 34 fertilizer plants serving agriculture in 32 states. It has used 'PAYLOADER' units since the first models were built by The Frank G. Hough Co., and also owns one of the largest 'PAYLOADER' fleets. This model H-25 at their Ft. Wayne operation is one of several of these new, more-productive units now serving in their various plants.

There are many reasons why the new Model H-25 will dig, carry and deliver more tonnage with lower operating and maintenance costs than anything in its class. One reason is its 2,500 lb. carry capacity — 500 lbs. more than ever before available with a machine having only 6-ft. turning radius. Greater operating ease, cycling speed and digging power are provided by power-steer, power-shift transmission (no clutching), and 4,500 lbs. of breakout force.

The Model H-25 has extraordinary protection against dust and dirt damage: precleaner and two oil-bath air cleaners; cartridge-type oil filters on the three oil systems; sealed self-adjusting hydraulic service brakes; parking brake enclosed in transmission; special oil and grease seals on all vital points.

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5-A-1

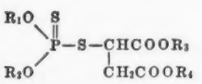
PATENTS

Continued from page 14

valent to not more than 125 grams, of P_2O_5 per liter; extracting phosphoric acid from said aqueous solution with a solvent selected from the group consisting of lower aliphatic alcohols and ketones of limited mutual miscibility with water, said solvent containing in solution water and HCl, the total quantity by weight of HCl in said solvent and said aqueous solution being of the order of the weight of phosphoric acid in the solution to be extracted; the total volume of the solvent used in the extraction being at least equal to the volume of said aqueous solution; separating the solvent extract thus obtained from the aqueous solution, and recovering concentrated aqueous phosphoric acid from the solvent extract.

2,879,284

Odor Removal and Stabilization of Phosphate-Containing Pesticides. Patent issued March 24, 1959, to Ralph D. Divine, Westfield, N.J. and John F. Yost, Noroton Hts., Conn., assignors to American Cyanamid Co. A method for the odor removal and stabilization of a malodorous pesticide represented by the formula:



in which R_1, R_2, R_3 and R_4 are each selected from the group consisting of aliphatic and aromatic hydrocarbon radicals which comprises adding thereto from about 0.01% to about 1.0%, by weight of a peroxide.

2,879,133

Anti-Caking Agent for Ammonium Nitrate. Patent issued March 24, 1959, to Paul O. Marti, Jr., Munster, Ind., assignor to Standard Oil Co., Chicago. Ammonium nitrate particles coated with a comminuted "H_2S treated iron-ferrocyanide" which particles are characterized by substantially free-flowability at atmospheric humidity and by a storage stability substantially that of dynamite grade ammonium nitrate, which "H_2S treated iron-ferrocyanide" is prepared by contacting iron-ferrocyanide with hydrogen sulfide gas at a temperature between about +20° and about +65° C. for a time sufficient to produce a solid reaction product containing between about 2 and about 7 weight percent of sulfur.

2,879,135

Manufacture of Sulfuric Acid. Patent issued March 24, 1959 to Alfred Haltmeier, Leverkusen - Bayerwerk, Germany, assignor to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany. In a process for the manufacture of sulfuric acid from the oxides of sulfur evolved in the roasting of sulfur-containing materials, the improvement comprising roasting said sulfur containing materials with heated air containing sulfur trioxide and sulfur dioxide in the form of mist, said heated air and mist being evolved from cooling the sulfuric acid by direct contact with air.

UREA

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evolved gas of any decomposition products other than carbon dioxide.

Duplicate experiments with urea-ammonia compositions containing no carbon dioxide gave the same results —i.e., no gaseous products other than carbon dioxide, which was evolved in amounts corresponding to the equivalent urea hydrolysis (less than 10%). Only a trace of biuret (less than 1%) was found in any of the partially neutralized liquors.

Ammonium Nitrate-Urea Solutions

The composition selected for these runs was: 20% ammonia, 68% ammonium nitrate, 6% urea, 6% water. Conditions of mixing were the same as those described above for "Uramon" ammonia liquor. Practically no urea was found in the resulting partially neutralized acid, and 5% of the total nitrogen introduced into the system was lost.

A very copious gas evolution occurred during the mixing. Mass spectrographic and infrared analysis of six gas-stream samples from the pre-neutralizer showed the following range of compositions:

47.2 to 52.4% Nitrous Oxide (N_2O)
45.0 to 52.2% Carbon Dioxide (CO_2)
0.6 to 3.5% Nitrogen Dioxide (NO_2)
0.5 to 3.6% Nitrogen (N_2)
0.2 to 1.2% Water Vapor

The amount of carbon dioxide in each case was that which would be evolved by hydrolysis of the urea; the amount of nitrogen lost from the system corresponded to the nitrous oxide formed.

The nitrous oxide is the gas component which may account for the physiological symptoms described in the paper cited above. It is also recognized that the only gas found here that has an appreciable level of toxicity is nitrogen dioxide.

This effect of ammonium nitrate on urea decomposition in the presence of strong sulfuric acid and the generation of nitrous oxide (N_2O) and carbon dioxide (CO_2) as major by-products can be explained by several hypothetical reactions. Most of these lead through the intermediate stages of urea nitrate and nitro-urea formation with ultimate decomposition of the latter to equivalent quantities of carbon dioxide, nitrous oxide, and ammonia.

Ammonium Nitrate-Ammonia Solutions

To investigate further the source of nitrous oxide, a run was made with the following composition: 22% ammonia, 65% ammonium nitrate, 13% water. Analysis of the pre-neutralizer liquor showed very little loss of nitrogen during mixing. The nitrogen oxides evidenced by the brownish fumes in the pre-neutralizer were not present in sufficient volume to pass into the scrubber and trap system. Analysis of the gas from the top of the pre-neutralizer showed it to be a mixture of several nitrogen oxides.

NEWS DIGEST OF THE WEEK

Superintendent Named For SunOlin Plant

PHILADELPHIA, PA. — Appointment of Eugene T. Dotts as maintenance superintendent of SunOlin Chemical Company's urea plant now under construction has been announced by James I. Harper, SunOlin president.

In his new post, Mr. Dotts will be in charge of the maintenance of all equipment at the 73,000 tons-a-year urea plant, to come "on stream" early in 1960.

While the plant is under construction at North Claymont, Del., Mr. Dotts will serve as field coordinator of construction for SunOlin. The general contractor for the SunOlin plant is M. W. Kellogg Co. of New York.

Diamond Plans New Research Laboratory

CLEVELAND, OHIO—R. F. Evans, chairman and president of Diamond Alkali Co., announced the awarding of the general contract for construction of a new multi-million dollar Research Center to be located in Concord Township, Ohio. The award has been made to the Brown Construction Co. of Cleveland. Construction will begin soon with completion of the facility anticipated in late 1960. When complete, the new center will accommodate Diamond's research department.

The Concord property of over 800 acres is located a few miles south of Painesville. The multiple-building facility will include a principal building comprising the research laboratory with 72,000 sq. ft. of floor area distributed among three floors, two of which will be at grade level. This building will include laboratory and office facilities, as well as the research department library, reception lobby and other necessary adjuncts to a research laboratory.

115 Firms Making Chemicals for Farm Use

SAN FRANCISCO — Some 115 firms were producing agricultural chemicals in California during the first three months of 1959, employing an average of about 3,000 persons. The division of statistics and research of the California State Department of Employment changed the classification of industry from the year before so that no comparable figures are available for the two periods.

About 45 of the firms employing some 1,000 persons were located in the Los Angeles marketing area, and 15 firms employing an additional 1,000 were located in the San Francisco-Oakland area.

California Chemical Employment Up

SAN FRANCISCO—Wage and salary employment in chemical manufacturing industries rose again between February and March to an estimated 38,100, according to the division of labor statistics and research of the California State Department of Industrial Relations. This increase continued a trend of several months.

The employment rise boosted the March total over the figure of the previous March, which was 37 300.

Average earnings of the production worker segment also increased between the respective periods. Earnings were up to an estimated $104.58 per week during March as compared with $102.09 during February, and $98.17 for March of 1958.

Witco Reports Income

NEW YORK—Witco Chemical Co., Inc., reports a net income of $448 000, or 59¢ per share, for the first three months of 1959. This compares with $355,900 net income before special item, or 58¢ per share on the smaller number of shares then outstanding, for the comparable period the previous year.

Sales and other income for the first-quarter of 1959 set a record high of $12,082,400, an increase of 34% over sales and other income of $9 022,300 for the same period in 1958.

New Plant Opens

JEFFERSON, ORE.—The Meeker Fertilizer Co. has opened a new plant here, with Glen Struckmeier of Albany, manager. Mr. Struckmeier came from Santa Ana, Cal., to accept the position. The new plant is one of six similar plants operated by Meeker Fertilizer. Others are located at Salem, West Stayton, Amity, Shedd

and Rickreall. The plant carries a full line of chemicals, all types of farm fertilizers, including liquid fertilizers.

Jack D. Hayes Elected Ketona Vice President

WILMINGTON, DEL. — Jack D. Hayes, assistant general manager of Hercules Powder Co.'s explosives department, has been elected vice president of Ketona Chemical Corp., announced P. H. Neal, president of Ketona.

A producer of anhydrous ammonia, nitrogen solutions, prilled ammonium nitrate and limed ammonium nitrate, Ketona is owned by Hercules and Alabama By-Products Corp.

Mr. Neal announced that Alto J. Smith and Mr. Hayes have been named to the Ketona board of directors to succeed J. M. Martin and John E. Goodman, who have resigned. Mr. Hayes' election as vice president fills a vacancy left by the resignation of E. St. Pierre Bellinger.

Other members of the Ketona board are: Mr. Neal, J. E. Johnson, F. G. Koenig, Jr., and R. A. Fulwiler, Jr.

Record Chemical Moves Into New Montreal Plant

MONTREAL — Record Chemical Co., Inc., has moved into its new plant at 840 Montee de Liesse Road, Montreal. The phone number is Ri 8-9329.

The firm was organized 12 years ago to manufacture and distribute insecticides. Later it started packaging various items for others in the insecticide, disinfectant and pharmaceutical field and currently is engaged in contract packaging and private labeling manufacturing. Joseph Kuchar is president.

Pilot-Plant Demonstration

MUSCLE SHOALS, ALA.—A pilot-plant fertilizer demonstration will be conducted by the Tennessee Valley Authority at the Muscle Shoals laboratories June 9-11, TVA has announced. Subjects for discussion include production of liquid fertilizers, granulation of high-nitrogen and no-nitrogen grades, and some factors affecting loss of nitrogen during granulation. A general resume of TVA's fertilizer research and development program will also be presented. Tours of the laboratories and manufacturing facilities will be arranged. Last year's demonstration attracted nearly 400 representatives of the fertilizer industry from 34 states, Hawaii, Puerto Rico and four foreign countries.

Phosphate Deliveries Up

WASHINGTON — U.S. production of superphosphate and other phosphatic fertilizers in February amounted to 234,758 tons (100% APA) compared to last year's February output of 210,339 tons, according to the U.S. Department of Commerce, Bureau of the Census in a report released May 4.

Shipments of superphosphate and other phosphatic fertilizers during the month totaled 174,067 tons, representing an increase of 3% over the volume shipped during the corresponding month of last year.

Stocks on hand at producing plants as of Feb. 28, 1959 totaled 382,499 tons, or 1% less than those held on Jan. 31, 1959.

Workers Decline

WILMINGTON, DEL. — Employment in chemical manufacturing in Delaware showed a decline of 100 workers during March. The new level was estimated at 25,700 as compared with 25,800 in February, according to the monthly report of the Delaware Unemployment Compensation Commission.

The figure remained well below March a year ago when the number of workers was 27,200.

Bolivia Receives ICA Fertilizer, Pesticide Grants

WASHINGTON—International Cooperation Administration has issued authorizations totaling $100,000 to Bolivia for fertilizer and pesticides. Included are a $55,000 nitrogenous fertilizer grant and a $45,000 pesticide grant. Contracting date ends next Aug. 31 and terminal delivery date is Sept. 30.

California Meeting

SAN MARINO, CAL.—The California Fertilizer Assn. has announced that the seventh annual California Fertilizer Conference will be held on the Davis campus of the University of California June 29-30. Sponsored by the soil improvement committee of CFA, the conference will be of interest to fertilizer executives and laboratory personnel as well as to agronomists.

To Expand Facilities

BUTTE, MONT. — United States Borax and Chemical Corp. has announced plans to expand its herbicide manufacturing operations and will move its factory to an isolated area on property owned by the Great Northern Railroad.

Dividend Voted

NEW YORK—The board of directors of American Potash & Chemical Corp. recently declared a quarterly dividend of 25¢ a share on the common stock, $1.00 a share on cumulative preferred stock, and $1.25 a share on special preferred stock. All dividends are payable June 15 to stockholders of record June 1.

NEW FERTILIZER FIRM

HANFORD, CAL. — Alfred A. Nunes has established the Kings Fertilizer Co. here to supply fertilizers and related materials.

Maryland Fertilizer Tonnage Down in '58

COLLEGE PARK, MD.—Fertilizer sales in Maryland during 1958 were 281,153 tons or 15,400 tons less than in 1957, reported L. E. Bopst, state chemist.

Best seller for the year, and the same since 1954, was 5-10-10 with 99,496 tons sold.

Book on Chemical Additives Published

WASHINGTON — The Association of Food & Drug Officials of the U.S. has published a book entitled "Appraisal of the Safety of Chemicals in Foods, Drugs and Cosmetics" by Arnold J. Lehman, et al., Federal Food & Drug Administration. J. F. Lakey, Texas Department of Health, Austin, secretary-treasurer of the association, said that the book is available from the association office for $2 a copy.

Speedy But Accurate Bag Filling a Necessity in Today's Economic Picture

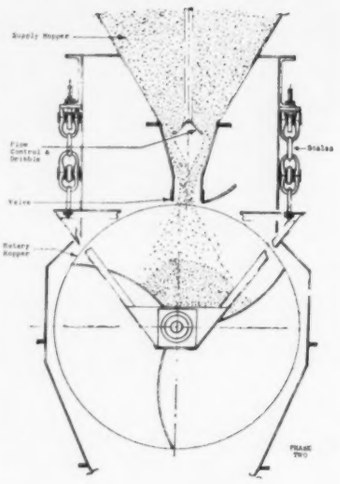
PACKAGING of hygroscopic fertilizers and other such materials has always posed a problem to manufacturers of bags and other containers in which fertilizers are shipped and stored. Not only are moisture problems a factor, but manufacturing economics also demand speed in filling bags, and accuracy to avoid excessive overages or shortages.

Many excellent machines are on the market at present, enabling the fertilizer manufacturer to package his output with a minimum of sweat, strain, worry and cost. Some of these devices have been discussed in earlier issues of the Production Edition to point out various phases of the bagging problem as it applies to fertilizers and pesticides.

Always an important consideration in appraising equipment of this type is the rate of production and the accuracy of filling mechanisms. One such machine is the "Rotomatic Packer" made by Raymond Bag Corp. This machine, according to its makers, is capable of cycling at the rate of forty-five 100 lb. units a minute, under ideal conditions. Under ordinary conditions found in the average fertilizer plant, the rate is of course governed by the ability of the operator in feeding bags to the filling tube.

Accurate rates are unaffected by the speed of operation, according to E. H. Pyle, packaging engineer for Raymond Bag. Neither is accuracy affected by reasonable variance in density of material, he adds. "The machine will pack standard 50 lb. to 100 lb. multiwall bags with equal ease. It takes only 60 seconds to change the size of the unit to be packed, and after the weight is changed, the machine delivers immediate accuracy."

Mr. Pyle emphasized that unusual accuracy is obtained under the type of working conditions ordinarily found in fertilizer plants. He reported that some users have stopped checking every fifth or tenth bag after filling, but merely periodically through the day as a precaution. "On one test we made, sixty 50 lb. bags were taken off the line consecutively and weighed. None showed more than 2 oz. plus or minus accuracy and the total 3,000 lb. was only 5 oz. overweight."

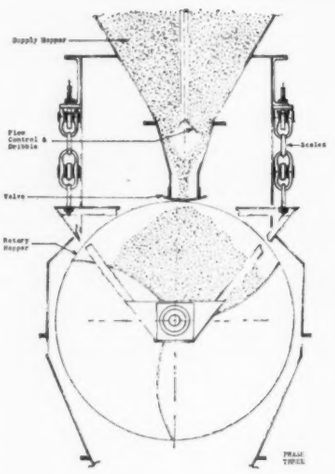


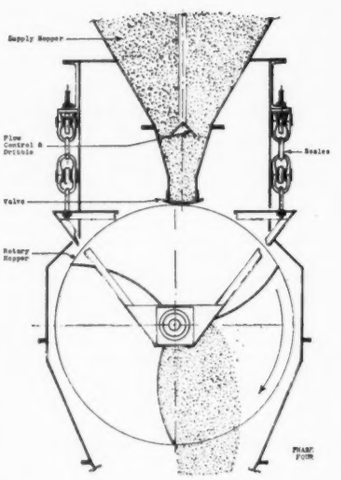
The makers describe the machine as utilizing the even balance scale principle. The design of the machine is such that material held in suspension is reduced to a minimum, since the hopper supply is cut off at the exact moment the desired weight is reached.

The company states that the machine is simple to operate and easy to service, requiring neither electrical current nor compressed air for operation. Bearings are outside of the machine and dust-proofed, the makers say.

As seen in the illustrations, the hopper is composed of three compartments and is suspended from the even-balance scale assembly. The device operates in a four-phase cycle:

ROTARY HOPPER—Schematic drawings on this page illustrate principle involved in bag-filling operations via the rotary method. The three-compartment hopper in the illustration at left is beginning to fill from supply hopper above. As it quickly fills, the scale mechanism activates the flow control valve, shutting off supply when the correct weight is reached, as seen in center illustration. Here, with the rotary hopper filled, the supply valve is shut. A minimum amount of material is in suspension. Final picture shows how the hopper revolves and dumps its load into the waiting open-mouth bag below. At the same time, the next compartment in the hopper is in place above to catch the next slug of material to start the cycle again.





1. The hopper is empty and supply hopper shutoff valve is closed to prevent any material from entering the packer.
2. The mass of material drops into rotary hopper and the flow control valve serves as a dribble feed to distribute the material evenly in the hopper.
3. When the rotary hopper is full, the scales trip the supply valve shut keeping a minimum amount of material in suspension.
4. The rotary hopper, now full, revolves and dumps into the open-mouth bag below. Upon rotating, the next compartment of the rotary device moves into position and the supply hopper has another batch of material to be dropped in next cycle.

Supplemental Instructions Given in Virginia For Fertilizer-Pesticide Mixes

RICHMOND, VA. — Supplemental instructions to fertilizer manufacturers "and other interested parties" have been issued by the Virginia state department of agriculture and immigration, division of chemistry and foods, according to Rodney C. Berry, director and state chemist.

The supplement states that all grades of fertilizer-pesticide mixtures containing Aldrin or Heptachlor which have been approved previously for the 1959 season for use on corn and/or peanuts may also be distributed in bulk under the same conditions as outlined for the bulk distribution of heptachlor mixtures for alfalfa.

These conditions, says Mr. Berry, are outlined in an earlier notice dated Feb. 3, 1959, under the subject of "Amendment to Instructions for Fertilizer-Pesticide Mixtures for 1959 Season." Vehicles which have already been approved by the state chemist's office for bulk transportation or distribution of fertilizer-heptachlor mixtures for alfalfa do not require further approval, Mr. Berry says.

However, some reminders are given by the state chemist for drivers of bulk vehicles and others handling fertilizer-pesticide mixtures. They are as follows:

1. Have a dust respirator available in the event of drifting of the dust.
2. Wear a hat and wear clothing that covers the arms and fits snugly at the neck.
3. Wash hands and face with soap and water at the end of each work period and before eating or smoking.
4. Bathe and change clothing each day.
5. Avoid unnecessary exposure to the mixture.

Pesticide Production Figures Reported for January-February, '59

WASHINGTON — Preliminary figures on production of pesticidal chemicals in the U.S. for January and February, 1959, have just been released by the U.S. Tariff Commission's chemical division.

Below is a table giving comparative figures:

	Jan., '59 Lb.	Feb., '59 Lb.
DDT	12,932,144	11,422,227
2,4-D	1,759,032	2,592,620
2,4-D acid esters and salts	2,806,650	2,775,619
2,4-D acid equivalent of esters and salts	1,986,356	2,076,058
Benzene Hexachloride (Including Lindane)	186,492	1,508,583
Gamma isomer content of BHC	———	204,647
2,4,5-T	542,614	502,996

Corrosion a Major Enemy in Management's Fight to Maintain Machines and Equipment

By Edwin C. Kapusta
U.S. Potash Co., Division
United States Borax & Chemical Corp.

CORROSION in liquid fertilizer plants is one of the continuing problems facing management people in these units. Some metals withstand the corrosive action of these chemicals better than others, of course. It is the responsibility of the plant management to have containers and other vessels of resistant materials for safety and economy.

In the majority of liquid fertilizer plants, mild steel is used as the material for all equipment with the exception of the reactor tank where raw phosphoric acid is neutralized with ammonia. The reactor vessel, or that portion of the vessel in which the neutralization is carried out, is normally constructed of stainless steel. Although little test data has been available, mild steel has proven generally satisfactory after several years of use in plant storage and application equipment.

Recent Tennessee Valley Authority investigations (1) on the corrosive effect of liquid mixed fertilizers have indicated that mild steel was either fully acceptable or very close to it under all combinations of variables tested. In these studies a corrosion rate of less than 20 mils per year was classified as fully acceptable, a rate of 20-60 mils per year as possibly acceptable and greater than 60 mils not acceptable. Corrosion rates for 8-8-8, 10-10-10, and 12-12-0 at room temperature were in the order of 0.4-0.9 mils per year. Higher phosphorus to nitrogen ratio mixtures had higher corrosion rates; 8-24-0 had a rate of approximately 1.1-1.2 mils per year.

Although corrosion rates were very low, mild steel test specimens exposed to potash containing solutions rusted on subsequent exposure to air. A series of tests were made to determine the degree of corrosion which might result from filling and emptying tanks and from leaving tanks empty for periods of time. In these tests the specimens were alternately immersed in solution and suspended in air. After completion of the 28 day test the specimens were exposed to air for 6 months and the weight loss determined.

Again, the corrosive effects in all tests at room temperature were very low and well within the acceptable ranges. Solutions tested included 8-8-8, 10-10-10, 6-6-12, 5-10-10, 6-12-12, and 8-16-8. A solution of potassium chloride (0-0-16.8) was included in this series to test the effect of potash alone. A relatively high corrosion rate (25.5 mils per year) was obtained indicating a chemical interaction between potash and other constituents in mixtures, since addition of potash to non-potash solutions in other studies reduced corrosion significantly.

Tests were also made to determine the corrosive effects of liquid mixtures at elevated temperatures from 165-200° F. Although degrees of corrosion were greater at these elevated temperatures, all corrosion rates were still in fully acceptable range or very close to it. The following effects were noted by TVA investigators.

(1) The high phosphate liquids (1-3-x) were three times as corrosive as the low phosphate (1-1-x) liquids tested.

(2) The potash containing liquids (1-x-1) were 60% as corrosive as the non-potash liquids (1-x-0) tested.

(3) The use of 0.1% sodium dichromate inhibitor decreased corrosion rate by about 95%.

(4) Aeration at O.02 cubic feet per minute increased corrosion rate by 100%. Mild steel was fully acceptable or very close to it under all conditions tested.

The established use of aluminum as a material of construction for tanks and application equipment for handling nitrogen solutions has raised questions concerning the corrosive effects of liquid fertilizer mixtures on aluminum. One of the surprising results of the TVA studies on the corrosive effects of liquid fertilizers on eight aluminum alloys tested was the beneficial effects of muriate of potash.

In these tests the presence of potash (K_2O to N=1) reduced corrosion by as much as 83% compared to non-potash solutions. Although the mechanism of the protection afforded by potash was not clearly defined, it appeared that the corrosion products, identified as ammonium alumino phosphates with part of the ammonium replaced by potassium, adhered closely to the aluminum forming a protective coating which reduced further contact of solution and metal.

The results of these studies indicated that aluminum appeared to be in a marginal category in regard to its use in handling liquid fertilizers depending on conditions of use. Considering a corrosive rate of less than 20 mils per year as acceptable and 20-60 mils per year as possibly acceptable, acceptable rates were obtained for all aluminum alloys in potash containing solutions at room temperature (72° F.). Acceptability varied, however, with conditions such as solution temperature, uniformity of corrosion over metal surface, etc.

The use of 0.1 per cent sodium dichromate as a corrosion inhibitor proved to be the most effective factor in decreasing the corrosive rate of liquid fertilizers on aluminum. With inhibitor, under practically all combinations of conditions studied, aluminum received a fully acceptable rating. The principal exception was 8-24-0 at a temperature of 122° F. Plants having coolers could cool the solution to non-corrosive levels prior to storage or shipment.

The corrosion problems which might be encountered in using aluminum equipment for handling liquid fertilizer solutions will vary with different fertilizer gradees and conditions of use. It is suggested that TVA studies will provide much useful information to those interested in pursuing this matter further.

Tests of the corrosive effects of liquid fertilizers near the boiling point on stainless steel indicated that corrosion rates were very low and most were negligible.

(1) Hatfield, J. D., Slack, A. V., Crow, G. L., and Shaffer, H. B., Jr., "Corrosion of Metals by Liquid Mixed Fertilizers," Agricultural and Food Chemistry, V. 6, No. 7, pp. 524-531, July, 1958.

David W. Lynch

NEW REPRESENTATIVE — David W. Lynch, active in sales and basic insecticides and chemicals to the pesticide and sanitary supply industries, has been appointed as sales-service representative for Vulcan Steel Container Co., Birmingham, Ala. Mr. Lynch has a wide acquaintance in these and other similar fields. The Vulcan firm makes a complete line of steel pails and drums for the industry.

PESTICIDE GRINDING

Continued from page 4

number of inventors who had in mind utilizing the principle of fluid energy for grinding, but lacked a means of controlling the stream in such a way that it would not wear out the mill itself. Different positions of jets, development of the stack mill, and relocation of the grinding nozzles were all tried in an effort to achieve controlled classification at the same time the grinding was taking place.

The first commercially economical fluid energy mill was designed by Nicholas N. Stephanoff, Fluid Energy Processing & Equipment Co., Philadelphia. His design divided the mill into two different zones, one for grinding and one for classifying. The grinding zone is trapezoidal in cross-section; the nozzles are placed on the angle of the periphery. This arrangement concentrates the solid material near the fluid nozzle, establishing the most efficient fluid grinding pattern, that of a flat vortex loading fluid streams more efficiently, reducing buildup of solids on the mill and eliminating excessive mill wear.

Units have been developed to meet requirements of the pesticide formulator who must meet specifications for certain types of product. Some such specifications set the particle size at 4 microns or less, based on the desire for higher suspensibility of wettable powder in liquid sprays. This is particularly necessary in areas where hand spraying equipment is to be used, as is frequently the case when World Health Organization specifications are involved.

The problem of maintaining homogeneity can be reduced with the new type mills, its makers state. The violent turbulence taking place in the fluid-type mill makes it ideal for blending while the grinding process is under way. Premixing of the toxicant, the inert and wetting agents, and other additives is the only step needed prior to grinding, in achieving uniform blend in the final product.

Use of fluid energy grinding widens the range of inert material which may be chosen by the formulator. Because the particle size, hardness and moisture content are of less importance to the pesticide producer, he is able to employ some materials that would cause excessive wear on conventional grinding machines.

It is particularly interesting to note that many of the new patented pesticides being offered in 1959 are being produced through air milling processing. Also revisions of processing techniques for technical grade toxicants as expressed in the new edition of production manual being distributed by the basic manufacturers recommend the use of fluid energy mills in order to achieve maximum or optimum specification finished product.

PRODUCTION EDITION

Editorial

EVERY OUNCE COUNTS . . .

'Give Away' Program Cuts Fertilizer Profit; Many Littles Make a Lot in Overweights

HOW COSTLY IT IS for fertilizer manufacturers to "give away" part of their finished goods in overweight bags! Even if the amount per bag may be seemingly small, the cumulative total over the period of a season or two amounts to a surprising figure.

At a recent meeting of the Georgia Plant Food Education Society, Robert A. Moncrief of the Georgia State Department of Agriculture told the group that some 8,000 official fertilizer samples had been taken during the past year, and that they averaged 35¢ a ton overage between the claimed values and the found values.

Well, at first glance, this doesn't seem so bad. A ton represents some 25 bags of fertilizer and that figures out to just a little over a penny a bag. Seems tolerable. But is it?

Mr. Moncrief reminded that the lowly 35¢ a ton loss, multiplied by the 1,230,000 tons of fertilizer made in Georgia each year counts up to some $400,000 worth of fertilizer virtually given away free. This is just for the state of Georgia.

Assuming this 35¢ a ton represents an average national figure (and it shouldn't be too far off one way or the other) and this same bit of arithmetic is applied to the 22,000,000 tons of fertilizers consumed in the U.S. each year. At this point the modest 35¢ figure takes on the aspects of a Frankenstein when its presents a tab of $7,700,000!

Plugging this loss should not be a tremendously difficult task, with modern metering, weighing and bagging equipment available to the trade from a number of suppliers.

The 35¢ loss on each ton of fertilizer appears to be one of those "tremendous trifles" which should be reduced. The trick is, of course, to cut down on this overage without going so far as to be found wanting when inspection is made. Accuracy is the keyword. Accurate adherence to grade and accurate measuring and weighing.

The fertilizer manufacturing industry has long since outgrown the era of the "by guess and by gosh" method of shoveling a few ingredients together, mixing them up, tossing the resultant material into a bag and selling it to the farmer.

Even though the farmer may gain a trifle in getting a few additional ounces of fertilizer in each bag, he might well question the skill of the manufacturer who permits such things to go on in his plant.

And by the same token, the manufacturer himself might question the economic wisdom of such a course.

Good Production Year Seen in Government Report on Fertilizer Industry Prospect

A GOOD PRODUCTION year for the period ending June 30 is expected by the fertilizer industry. There are heartening reports of increasing production and use of plant foods from many portions of the country and indications are that tonnages this year will exceed those of 1958 by a considerable margin.

There are a number of favorable factors involved for the future, too. Demand for more plant food is likely to push up production figures in many plants as more farmers learn that there are very attractive profits to be realized from adequate application of fertilizers.

Production and imports of plant foods during the 1957 and 1958 calendar years followed pretty closely the trends of consumption in the 1956-57 and 1957-58 fertilizer years (July 1-June 30), the U.S. Department of Commerce has reported.

Production of synthetic nitrogen increased about 3.5% in 1958, more than offsetting declines in by-product nitrogen output and imports of 26% and 12%, respectively. Exports also showed a drop of 27%, so that total nitrogen moving into domestic consumption, including industrial uses, was about 3% higher in 1958 than in the previous year.

Production of phosphatic fertilizer of approximately 2.4 million tons P_2O_5 in 1958 was down about 2% from 1957 despite a 20% growth in output of ammonium phosphates and miscellaneous phosphatic materials. The uptrend in concentrated superphosphate for past years was not evident in 1958, probably because of the growing use of phosphoric acid directly in the mixing process, as well as competition from the ammonium phosphates. Exports of phosphatic materials, excluding phosphate rock, decreased about 10% in 1958.

Potash production totaled 2,190,000 tons K_2O in 1958, a 3% decline from the 1957 level, according to a preliminary report of the Bureau of Mines. However, sales reached 2.2 million tons, a 3% increase. Imports were up nearly 20%; exports, although down about 10%, still exceeded imports, but the net of some 50,000 tons K_2O was only about half that of 1957.

The production and use trend of fertilizers is definitely on the upgrade. With it is an accompanying trend toward higher analysis goods, more granular material in the case of solid fertilizers, and the idea of complete liquid mixes seems to be gaining in favor, too.

It all adds up to a good, live industry.

Croplife's Home Office

Croplife
PRODUCTION EDITION

BPA — *Member of Business Publications Audit*

NBP — *Member of National Business Publications*

CROPLIFE is a controlled circulation journal published weekly. Weekly distribution of each issue is made to the fertilizer manufacturers, pesticide formulators and basic chemical manufacturers. In addition, the dealer-distributor-farm adviser segment of the agricultural chemical industry is covered on a regional (crop area) basis with a mailing schedule which covers consecutively, one each week, three geographic regions (South, Midwest and West) of the U.S. On the fourth week, production personnel in fertilizer manufacturing and pesticide formulating plants throughout the U.S. are covered in depth. To those not eligible for this controlled distribution, Croplife's subscription rate is $5 for one year ($8 a year outside the U.S.). Single copy price 25¢.

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Industry Meetings

May 21—Chemical industry safety workshop, sponsored by Manufacturing Chemists' Assn., Palmer House, Chicago.

June 4—Executive Committee meeting, Fertilizer Section, National Safety Council, Roanoke Hotel, Roanoke, Va.

June 9-10—Seventeenth Annual Convention of the Association of Southern Feed and Fertilizer Control Officials, Velda Rose Motel, Hot Springs, Ark.; Maurice Rowe, Virginia Department of Agriculture, 1122 State Office Bldg., Richmond 19, Va.

June 9-10—Assn. Southern Feed & Fertilizer Control Officials, Velda Rose Motel, Hot Springs, Ark.

June 9-11—Pilot plant demonstration on recent developments in fertilizer production technology. Muscle Shoals laboratories, Muscle Shoals, Ala.

June 11-13—Manufacturing Chemists' Assn., The Greenbrier Hotel, White Sulphur Springs, W. Va.

June 14-17—National Plant Food Institute, Annual Convention, the Greenbrier, White Sulphur Springs, W. Va.

June 29-30—Seventh Annual California Fertilizer Conference, University of California, Davis, Cal.

July 7-9 — Pacific Northwest Plant Food Assn., 10th Annual Regional Fertilizer Conference, Tacoma, Wash.

July 15-17—Southwestern Fertilizer & Grade Meeting, Galvez Hotel, Galveston, Texas.

Aug. 18-22—Canadian Fertilizer Assn., Bigwin Inn, Lake of Bays, Ontario.

Oct. 13-14—Fall meeting, Western Agricultural Chemicals Assn., Villa Motel, San Mateo, Cal.

Oct. 21-23—National Agricultural Chemicals Assn. 26th annual meeting, French Lick-Sheraton Hotel, French Lick, Ind.

Nov. 4-6—Fertilizer Industry Round Table, Mayflower Hotel, Washington, D.C.; Dr. Vincent Sauchelli, National Plant Food Institute, chairman.

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QUESTIONS

Continued from page 8

ing of the sprayed portion. This technique requires:

"1. Careful calibration of the spray nozzle delivery.

"2. Faithful variation of the spray pressure to match the variation of the flow rate of the fertilizer stream.

"3. Adequate turning and mixing of the stream.

"4. Uniformity of the fertilizer flow rate.

"Alternatively, the Aldrin can be added to the fertilizer stream as free-flowing 20 or 25% granules. This, of course, requires some means to meter the flow of granules interlocked with the fertilizer flow rate.

"Also, the Aldrin can be added as a solution or granules at a point 6 to 8 ft. from the discharge end of the cooling tube sometimes used in granulating fertilizers. As in other cases, the temperature here should not exceed 120° F.

"It is important to note here that, under recommended conditions of use, no cases of intoxication by Aldrin have occurred during manufacture, formulation, and application of many millions of pounds of this insecticide over the past 10 years.

"Experience indicates that the chief hazard in handling of insecticides is from accidental exposure to the concentrates. The hazard from exposure to field-strength dusts, granules, and mixtures is negligible, if reasonable attention is given to personal hygiene and cleanliness.

"Even with concentrated insecticides, there is a satisfactory safety margin in handling them, providing care is taken to avoid direct contact. If contact does ensue, the contaminated areas must be thoroughly cleansed. Since the greatest occupational hazard is absorption through the skin, utilization of proper types of concentrates will help to minimize this danger. Use of granules or liquid concentrates is an important step in this direction, since granules produce a minimum of dust.

"Similarly, liquid concentrates are preferred for the addition of Aldrin to pelletized fertilizers.

"Where dusts are used and are likely to contaminate working areas, suitable protection and decontaminating facilities, such as respirators, protective clothing, forced ventilation, and showers should be used.

"The normal practice of fertilizer workers taking a shower at the end of a working day should, of course, be encouraged. A soap and warm water shower also removes any contaminating dust.

"Additional information is available in 'Safe Handling of Aldin and Dieldrin—First Aid and Information for Physicians,' available from district offices of Shell's Agricultural Chemicals Division."

Potash Deliveries Dip

WASHINGTON — A slight dip in deliveries of potash for agricultural purposes was noted during the first quarter of 1959, according to the American Potash Institute. Deliveries were 898,743 tons of salts containing an equivalent of 523,540 tons K_2O. This was a decrease of 3% in salts and 4% in K_2O under the same period in 1958, API reports.

11 Companies Hold Canadian Potash Acreage Permits

REGINA—In mid-March 11 companies held acreage in the 340 mile long Canadian potash belt, the Industrial Development Office of the Saskatchewan Government reported recently.

The government office said that:

A total of 1,300,000 acres was held under permit: 350,000 acres under withdrawal; 87,300 acres by reservation, and 12,576 under lease.

Commonwealth Potash Chemical Ltd. holds 62,720 acres under permit. Duval Sulphur and Potash Co. holds two permits, one for 70,720 acres and the other covering 56,960 acres.

Continental Potash Corp. has a permit for 95,200 acres. General Petroleum of Canada Ltd. holds a permit for 54,720 acres. International Minerals & Chemical Corp. holds two permits, one for 91,945 acres and the other for 98,129 acres.

National Potash Co. has a permit for 100,000 acres. Potash Company of America, with its mine in production at Saskatoon, has 12,576 acres under lease and 87,300 acres held by reservation. The company also has a special magnesium agreement with the government covering 100,000 acres at Quill Lake.

S.A.M. Exploration Ltd. holds a withdrawal of 31,040 acres. Canadian Amco, a wholly-owned subsidiary of Southwest Potash Corp., holds two withdrawals, one for 52,568 acres and the other for 34,240 acres. The company also has 53,120 acres under permit.

U.S. Borax & Chemical Corp. has one permit for 99,883 acres and a second permit for 8,320 acres. Alwinsal Potash of Canada Ltd. holds a permit for 97,440 acres, and two withdrawals totaling 196,000 acres.

Walter I. Rodgers

NEW APPOINTMENT — Walter I. Rodgers, administrative assistant to F. G. Bemis, president, Bemis Bro. Bag Co., has been appointed assistant to the manager of the firm's East Pepperell, Mass., multiwall bag factory. Mr. Rodgers will assist F. G. Bemis, Jr., East Pepperell manager, in operation of the plant. Mr. Rodgers joined the firm in 1947 as a sales representative for the New York sugar bag sales division, and became affiliated with the New York general sales division in 1953. He served in that position until 1957 when he was appointed the president's administrative assistant. Mr. Rodgers was graduated from Yale University in 1942, where he earned a bachelor of science degree in applied economic science.

Technical Serviceman

NEW YORK—C. Graham Randall has been appointed technical service representative for the northwest states by Stauffer Chemical Co. He will be associated with the agricultural chemical division. He was formerly with the firm's research laboratories at Mountain View, Cal.

Chemist Dies

BALTIMORE—George C. Bollinger, 48, chief chemist at the chemical control laboratory of American Agricultural Chemical Co., died March 25. He joined the chemical control department of the firm in 1928 and had been chief chemist at Baltimore since 1945.

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